Kennedy Space Center

Employee Safety & Health Pocket Guide

October 2002

VPP

TABLE OF CONTENTS

Please direct any questions, suggestions or comments to:
Florence Patten, Mailcode QA-D, 867-2532
mailto:Florence.Patten-1@ksc.nasa.gov

Introduction

At KSC, mission success starts with safety, and “safety and health first” is one of KSC’s four guiding principles. KSC is committed to protecting the safety and health of the general public, the NASA work force including Astronauts, and our high-value assets on and off the ground. This commitment begins with senior management, and permeates to all levels of the organization. All supervisors and leaders at all levels are responsible for providing their employees a safe and healthy work environment, and all personnel working at KSC are charged with responsibility for working in a safe manner and watching out for the safety of their co-workers.

The purpose of the KSC Employee Safety & Health Pocket Guide is to provide a quick reference to NASA and KSC safety and health policies and requirements. By abiding by the safety and health policies and requirements outlined in this handbook and further detailed in NASA and KSC Directives, we are continuously improving the KSC Safety & Health Program toward our expectation of zero mishaps in the workplace and in our daily lives. Remember, safety and health are about safe and healthy behaviors at work and at home.

Roy D. Bridges, Jr.
KSC Center Director

Section 1 – Safety & Health Policy

Agency Safety Initiative (ASI)

- The goal of ASI is to for NASA to be the nation's leader in safety & occupational health of our work force and the safety of our products and services. In order to accomplish this, NASA continues to strengthen it's capabilities ensuring that safety & health considerations permeate all aspects of our work, and that safety & health principles and practices are embedded into all NASA decision-making processes.

- NASA will not compromise the safety & health of people, property or the environment with the following prioritized safety objectives:
  - Protect the public, since NASA must protect them from harm.
  - Protect astronauts and pilots, since they are exposed to high-risk scenarios.
  - Protect employees, since NASA owes it to its employees to provide a safe and healthful workplace.
  - Protect high valued equipment and facilities, because NASA is a steward of public trust.

- NASA's expectation is to have zero mishaps in the workplace.

- NASA is committed to improving its safety & health program through it's Four Core Process Requirements (CPRs):
  - Management commitment and leadership
  - System & worksite hazard analysis
  - Hazard prevention & control
  - Safety & health training

KSC Safety & Health Policy

- It is KSC policy to provide a safe and healthful work environment for all employees. The workplace shall be free of unsafe and unhealthful conditions that could cause loss of life or injury or damage to facilities or equipment.

- The Center Director has ultimate responsibility for the KSC Safety & Health Program, and implements the program through delegation of specific responsibilities at all levels. The Center Director also charges all employees with responsibility for safety and health.

- Every KSC employee is responsible for ensuring a safe & healthful workplace. All employees shall report all unsafe and/or unhealthful conditions or acts to their supervisor without fear of disciplinary action or retaliation of any kind.

- When unsafe and/or unhealthful conditions or acts pose “imminent danger” to personnel or property, all employees are vested with the right and are obligated to exercise the stop work authority.

- All first-line supervisors are responsible for investigating any safety or health concern reported to or discovered by him or her, and for initiating corrective action. Supervisory reprisal for employees reporting safety or health concerns will not be tolerated at KSC.

- All personnel at KSC, whether they are NASA or contractor employees or visitors, shall comply with the safety and health policies and procedures. All jobs can be performed in a safe and healthful manner, and unsafe and/or unhealthful behavior will not be tolerated. In addition, all employees have the right to refuse to perform work that they feel is inherently unsafe and/or unhealthful, but they are obligated to work with management to determine how the work can be performed in a safe and healthful manner.

- All employees and the labor unions shall participate in KSC safety and health activities to the maximum amount that is practicable. Supervisors shall encourage and support employee participation in these activities.

KSC Safety & Health Policy (continued)

- Violations of KSC safety & health policy and procedures by **civil service** personnel shall be taken seriously and could result in disciplinary actions, including removal from Government service. The KSC Disciplinary Program provides guidelines on appropriate corrective actions.

- Violations of KSC safety and health policies and procedures by **contractor** personnel shall be treated in a serious manner and could result in the person being barred from Center access. In addition, these violations could become a factor for contract termination, award fee determination or future contract considerations.

- Violations of KSC safety and health policies and procedures by **visitors** shall also be taken very seriously and may result in the visitor being barred from the Center.

z

KSC Disciplinary Program

- KSC's general philosophy regarding safety and discipline centers around striking an appropriate balance between educating and training employees, and reserving formal disciplinary measures for the more serious violations. Supervisors are encouraged to counsel employees for incidents of a less serious nature.

- The KSC Disciplinary Program covers a broad range of conduct-related offenses and resulting disciplinary actions, including those for safety and health violations.

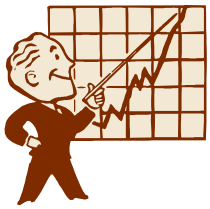
- Employees are charged with responsibility to report safety problems or concerns to their supervisor.

- Supervisors are responsible for:

  - Discussing violations with their Human Resource Specialist (HRS) in order to obtain assistance in determining the appropriate corrective actions.
  - Discussing the problem with the appropriate employee(s).
  - Documenting the problem and associated corrective actions.

- Penalties should fit the offense, such as for similar incidents. Penalties are progressive in nature depending on seriousness and prior offenses, and can range from informal counseling to removal of the employee. The intent of the disciplinary action is to improve the employee's performance and change unsafe or unhealthy behaviors.

- The controlling documentation for the KSC Disciplinary Program is KNPG 3752.2, Guidelines for Disciplinary Actions. The Human Resources Management and Development Office (BA-C) can provide guidance on issues related to the KSC Disciplinary Program.



KSC Safety & Health Program Objective and Goals

- **KSC Guiding Principle -** As part of its strategic planning, KSC has adopted "Safety and Health First" as one of its four Guiding Principles.

- **KSC Safety and Health Objective -** In addition, KSC has established the following Safety and Health Objective: To enhance the Safety and Health of the KSC Workforce.

- **KSC Safety & Health Goals -** The following goals will guide KSC in achieving its Safety and Health Objective:

  - No lost time injuries at KSC.
  - All mishaps and close calls are reported.
  - All mishaps and close calls are investigated in order to identify the root cause, and take appropriate action to prevent recurrence.
  - All workplace hazards are identified and eliminated or controlled in a timely manner.
  - All processes involving hazardous material or equipment, or posing a risk to personnel, facilities, critical equipment or mission capability, are analyzed for potential safety and health hazards, and identified hazards are controlled to an acceptable level.
  - Reduction in the risk for cardiovascular disease among KSC personnel.
  - All personnel complete all required safety and health training in the specified time frame.
  - All personnel are provided the opportunity to participate in meaningful safety and health program activities.

Safety and Health Responsibilities

All employees at KSC shall:

- Complete their required safety & health training.
- Work safely & comply with safety policies and procedures.
- Assess work & environment for unsafe or unhealthful conditions or acts of others.
- Inspect tools & equipment prior to each use.
- Ensure that required safety devices & equipment are available, clean and functional.
- Eliminate hazards within the employee's control.
- Report close calls & unsafe/unhealthful conditions or acts to your supervisor.
- Assist supervisor in determining corrective action for hazards.
- Participate in safety & health activities.

All supervisors and managers shall:

- Complete their required safety & health training.
- Ensure that all of their employees have a safe and healthful workplace.
- Encourage all of their employees to report close calls & unsafe and/or unhealthful conditions or acts.
- Assess & initiate corrective actions for reported hazards.
- Perform and document their monthly safety & health inspections (safety & health walk- downs) in the Goal Performance Evaluation System (GPES).
- Conduct and document attendance of monthly organizational safety meetings.
- Encourage all employees to participate in safety & health activities.
- Ensure that pre-test or pre-task briefings are conducted for all hazardous operations under their responsibility.
- Perform and document job hazard analyses (JHA's) for each type of job that their employees perform.
  - JHA's integrate safe practices into operations.
  - JHA's identify work sequence, anticipated hazards, and control measures to reduce hazards to an acceptable level.
- Perform and document a training need assessment for each employee that they are responsible for, and define any gaps.
- Determine and supply all Personal Protective Equipment (PPE) that is needed for each employee that they are responsible for, and
- Maintain open, non-retaliatory lines of communications between themselves and their employees.

Senior Management shall:

Fulfill all of the responsibilities described above under supervisors and managers and ensure that there are adequate resources available to achieve Safety and Health Program goals.

- **Facility Managers:** Each facility has a primary and alternate facility manager, normally stationed within their assigned facility. Facility managers are responsible for:

  - Providing facility safety & health information to facility occupants.
  - Supporting the facilities excellence, energy conservation, fire, safety and health, and environmental programs.
  - Ensuring the facility is maintained and left in an orderly condition when vacated.
  - Coordinating requests for utility outages with facility functional users.
  - Conducting periodic facility walk-through safety & health inspections of the facility common areas at KSC.
  - Supporting Directorate Facility Utilization Managers (DFUM) at KSC with space for maintenance, repair, or modification of the facility common areas at KSC.
  - Assisting in the surveillance of facility support services (janitorial, grounds maintenance, refuse collection, etc.) and report safety and health related problems in the facility common areas at KSC.

- Specific information and a listing of Facility Managers is available under "Facilities" at: http://sgs.ksc.nasa.gov

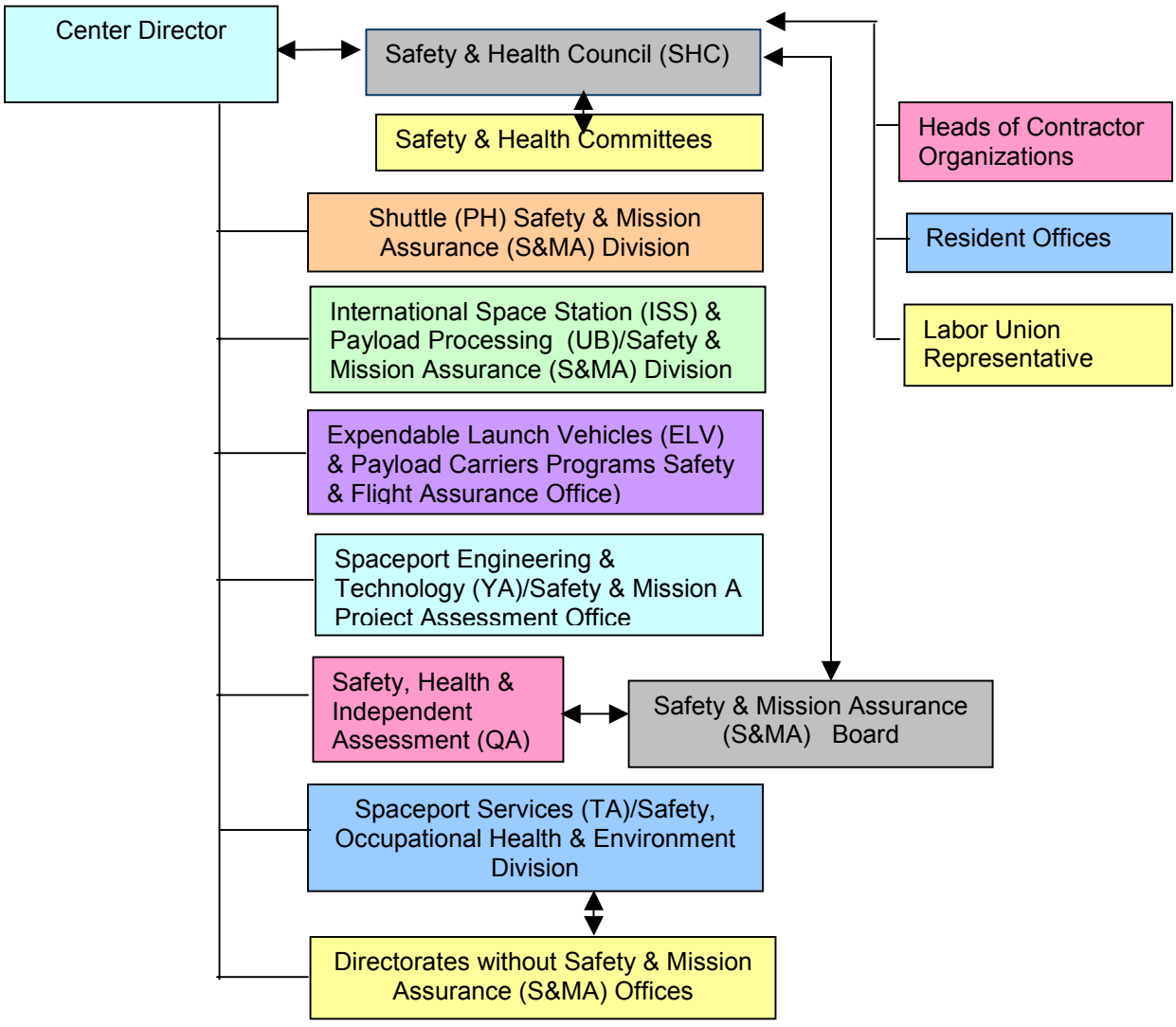
Visitor Safety

- All visitors must comply with NASA, KSC, and other applicable safety & health policy directives, guidelines, and procedures.
- All visitors, whether escorted or not, must have a KSC-badged sponsor.
- Center sponsors assume responsibility for the safety of their visitor including ensuring they are aware of exit routes, evacuation procedures, special or unusual conditions, and any hazardous operations that are underway.

Section 2 – Safety & Health General Information

KSC Safety & Health Organizations

- KSC's safety and health organizations are functionally structured as shown in the diagram below. All safety and health organizations have access to the Center Director.



- The Safety, Health and Independent Assessment (SHIA) Directorate develops and interprets safety & health policies, performs independent assessments and provides consultation services to operating organizations
- The KSC Programmatic S&MA Offices are responsible for implementing KSC safety and health policies and procedures and to conduct their respective program in a safe and healthful manner.
- The Spaceport Services Directorate provides institutional safety and health support & consultation for all KSC civil service organizations.

Safety & Health Councils, Boards, Committees & Panels

Safety & Health Council (SHC)

The purpose of the SHC is to maintain an overview of KSC's safety & health programs through the establishment and direction of a sub-board system to focus KSC expertise on safety and health program critical elements. Membership includes KSC Senior Management, KSC Contractor Chief Operating Officers, Resident Office Representatives and the Labor Union Representative. The point of contact for the SHC is Bert Garrido (867-1982).

S&MA Board

The Safety & Mission Assurance (S&MA) Board integrates the work of the S&MA organizations across the Center and assures inter-directorate communication of technical S&MA concerns. Membership includes the S&MA Office chiefs across the Center. The point of contact for the S&MA Board is Bert Garrido (867-1982).

Human Research Institutional Review Board (IRB)

The KSC Human Research Institutional Review Board reviews, approves/disapproves and provides oversight of all KSC research involving human subjects. The point of contact for the Human Research IRB is Dr. David Tipton (867-6385).

Explosives Safety Committee

The KSC Explosives Safety Committee provides a forum for the interchange of information, technology, and innovative ideas pertaining to explosives safety, and ensures that the NSS 1740.12 NASA Safety Standard for Explosives, Propellants and Pyrotechnics is understood and implemented. The point of contact for the Explosives Safety Committee is Jim Fowler (867-6959).

Lifting Devices and Equipment (LDE) Committee

The KSC LDE Committee ensures that program requirements for cranes, hoists and other lifting devices are understood and applied, and provides assessments and recommendations for LDE systems. The point of contact for the LDE Committee is Malcolm Glenn (861-4128).

Radiation Protection Committee

The KSC Radiation Protection Committee ensures that all persons, property, and the environment under KSC jurisdiction and direction are protected from the exposure hazards associated with ionizing (radioactive material and X-rays) and non-ionizing (lasers and radio frequency [RF] waves) radiation sources. The committee is also responsible for developing and maintaining the KSC Radiation Protection Program policies and for reviewing and approving the usage of controlled radiation sources. The point of contact for the Radiation Protection Committee is the Radiation Protection Officer, Randy Scott (867-6958).

Lightning Safety Assessment Committee

The KSC Lightning Safety Assessment Committee is responsible for reviewing and approving all KSC lightning safety and lightning protection procedures and standards, and providing assessment and recommendations concerning lightning safety and lightning protection activities and systems. The point of contact for the Lightning Safety Assessment Committee is Terry Willingham (861-4110).

Pressure Vessels/Systems Safety (PV/SS) Committee

The KSC Pressure Vessels/Systems Safety Committee provides a forum for all ground based Pressure Vessel/Systems design, certification, re-certification, in-service inspection, and documentation requirements and compliance. The point of contact for the PV/SS Committee is Mickey Riddle (867-6131).

Safety and Health Labor Management (SHLM) Committee

The KSC Safety and Health Labor Management Committee assists the safety and health program in addressing concerns and issues affecting the safety and well being of NASA employees. Committee membership is made up of an equal representation of management and AFGE union representatives. The point of contact for the SHLM Committee is Florence Patten (867-2532).

Respiratory Protection Panel

The Respiratory Protection Panel is a contractor-led forum established to coordinate policy and resolve issues associated with the use of respiratory protection equipment used at KSC. The point of contact for Respiratory Protection Panel is the Respiratory Protection Officer, Mike Cardinale (867-6342).

Emergency Preparedness Planning Committee (EPPC)

The Emergency Preparedness Planning Committee determines emergency preparedness and response training and exercise development, and evaluates lessons learned from drills and actual emergencies. The EPPC is chaired by the KSC Emergency Preparedness Officer (EPO). The point of contact for the EPPC is Wayne Kee (867-8723).

Disability Awareness and Action Working Group (DAAWG)

DAAWG demonstrates its advocacy on behalf of individuals with disabilities and disabled veterans at the Kennedy Space Center (KSC) by informing KSC management and workforce about the requirements and accomplishments of disabled employees; recommending how to eliminate physical and other barriers that hinder their productivity and advancement; encouraging communication between disabled employees and the DAAWG; advocating the hiring, placement, and advancement of the disabled; and seeking to inspire adaptation of the disabled in the work force as a way of life at KSC. The point of contact for DAAWG is Marvin Jones (867-7246).

Process and Human Factors Engineering Working Group (PHFEWG)

The purpose of the Process and Human Factors Engineering Working Group (PHFEWG) is to assist in the development and implementation of process and human factors engineering related policies, tools, techniques, training and knowledge management. The point of contact for the PHFEWG is Gena Baker at (867-4261).

KSC VPP Leadership Committee

The KSC VPP Leadership Council is the coordinating organization for all of the activities being carried out by NASA and numerous contractor organizations that are or are attempting to be included in the OSHA Voluntary Protection Program. The point of contact for the VPP Leadership Council is Art Edwards (861-1298).

The point of contact for the minutes of these groups is Donna Lozaw, QA-B (867-3311). The minutes are posted in KSC Business World at:
http://businessworld.ksc.nasa.gov/Businessworld/html/safety_health.html

Health Services

- **Medical -** KSC has a comprehensive Health Program for all employees. Health services include:
  - Annual physical examinations are available to all KSC civil servants through the Federal Employee Health Program.
  - Pre-placement and work-related physical examinations are provided to NASA and Contractor employees whose job requires medical screening. In addition, physician consultations are available upon request.
  - Onsite medical clinics are available to all badged employees for evaluation and treatment of occupational related injury or illness, medical emergencies and first aid treatment.
  - The Employee Assistance Program (EAP) provides counseling and referral services by a certified professional to employees experiencing emotional stress, family or relationship problems, substance abuse problems, or financial concerns. Appointments are confidential and may be made by calling 867-7398. EAP also provides support groups for diabetes, smoking cessation, grief, cancer, and elder care.
  - Located at the O&C Facility and the OSB Facility the KSC Fitness Centers offer several free health and fitness programs to all badged KSC employees. Go to http://fitness.ksc.nasa.gov/ for more information.
  - Rehab Works is a free Musculoskeletal injury rehabilitation program available to KSC civil service or contractor employees. For more information go to http://rehabworks.ksc.nasa.gov/ or call 867-7497.
  - Health Education/Screening Programs for diabetes, cardiovascular disease, hypertension, vision, colorectal cancer, and a number of wellness initiatives are available to KSC civil Service and contractor employees at the Occupational Health Facility (OHF) clinics.

- The main Occupational Health Facility (OHF) is located near the KSC Headquarters Building, at the corner of 2nd Street and C Avenue; and the Launch Area Clinic (LAC) located near the VAB in the MFF. Hours of operation are 0700 to 1700 at the OHF, 0700 to 1530 at the LAC. For additional information call 867-3346 or visit the website at: http://sgs.ksc.nasa.gov/sgs/sites/other/chs/occmed/index1.htm

KSC Heat-Induced Illness

- Anyone working in a non-air conditioned environment (high temperatures and high humidity) is susceptible to heat-induced illness.

- Workers at higher risk for heat illness are those taking certain medications, with previous heat-induced illness, and those that wear personal protective clothing (PPE).

- Measures that can protect workers from heat-induced illness include building up tolerance to heat, performing the heaviest work during cooler parts of the day, drinking plenty of fluids, wearing light and loose clothing, taking frequent breaks in the shade, and avoiding heavy meals and caffeine just before working.

- Employees should be aware of the symptoms and what to do for cases of heat-induced illness. The most severe forms of heat–induced illness are: Heat Exhaustion, and the more serious Heat Stroke.
  - Heat Exhaustion
    - Symptoms include perspiration (pale clammy skin), dizziness, weakness, irritability or confusion, nausea and/or dehydration.
    - Actions to take include moving the person to a cooler shaded area, staying with the person, having them lie down (on their back if dizzy, or on their side, if nauseated), removing heavy clothing, providing small amounts of cool water (if not nauseated), and fanning them and/or cooling them with mist or a wet cloth. If there is no improvement in a few minutes, **call 911 (867-7911 on a call phone).**
    - If left untreated, heat exhaustion may advance to heat stroke.
  - Heat Stroke – a medical emergency!
    - Symptoms include lack of perspiration (dry, pale or red skin), extreme dehydration, disorientation, seizures or fits, and unconsciousness.
    - **Immediately call 911 (867-7911 on a cell phone).** Then, actions to take include moving the person to a cooler shaded area, staying with the person, having them lie down (on their back and clear of objects if seizures are occurring, or on their side, if nauseated), removing heavy clothing, providing small amounts of cool water (if not nauseated and able to drink), fanning and/or cool them with mist or a wet cloth, and placing ice packs under arm pits and groin area (if available).

Maximum Work Time (MWT)

- The KSC Maximum Work Time requirements exist to ensure that employees do not work excessive hours and adversely affect their lives away from work or compromise safety and mission success at KSC. These limits apply to all KSC civil service and contractor employees in critical or non-critical positions. The controlling documentation for MWT requirements is KHB 1710.2, KSC Safety Practices Handbook.

- A Critical Position is a position in which job performance can directly impact ground or flight safety, or mission success. In the types of positions, there is no more than one level of checks and balances regarding the employee's decisions or actions.

- Civil Service and Contractor supervisors shall ensure that KSC MWT requirements are enforced, pre-approved deviations for critical positions are documented, violations (exceeding MWT limits without prior approval) are reported to the organizational Director, and that all employees know and understand requirements.

- MWT requirements are:

  - Persons shall not work in excess of 12 consecutive hours (or 16-hours in an emergency situation).

  - Persons shall not work in excess of 60 hours during a work-week (7-day period).

  - Persons shall not work in excess of 7 consecutive days without at least 1 full day off. A pre-approved deviation for up to 14 consecutive days may be processed, and an extension for up to 18 consecutive days may be processed under certain circumstances. Working more than 18 consecutive days is only allowed when a Program Declared Emergency (PDE) or Center-wide Declared Emergency (CDE) is in effect. Certain specific operational/processing scenarios are exempted from consecutive workday limits since exceeding the limits is reasonably expected, and the nature of the work is such that the limits can be exceeded without causing excessive employee fatigue.

- Persons shall not work in excess of 240 hours during a 4 consecutive work week.

- Persons shall not work in excess of 2500 hours during a rolling 12-month period. Approval from the immediate supervisor, program/project or organizational director, and the Associate Director of S&MA (SH&IA) is required for deviations from this limit.

- There are strict reporting and record keeping requirements for critical positions.

- The point of contact for MWT requirements is John Branard, QA-C (867-2268).

Safety Variances

- Safety Variances are processed in order for Center Management to maintain control over Agency and Center Safety & Mission Assurance (S&MA) policy and requirements. A "Variance" is documented and approved permission to perform some act or operations contrary to established requirements. The controlling documentation for safety variances is KHB 1710.2, KSC Safety Practices Handbook.

- The two (2) types of safety variances are:

  - Deviations – An alternate means that meets the intent of the requirement and provides an equivalent level of safety with no additional risk.

  - Waivers – An alternate means through which an increased level of risk has been documented and accepted.

- Whenever it is deemed necessary to vary from established safety policy and/or requirements, a risk assessment shall be performed and documented to provide management with adequate information to make an informed decision regarding its disposition. Proposed variances shall not be granted for operational convenience or political gain of the requesting organization. Safety variances shall be approved prior to implementation, and there are provisions for processing real-time safety variances under certain circumstances.

- The Safety Variance Process consists of:

  - The initiating organization initiates the request by obtaining a KSC Safety Variance number from the KSC Safety Variance and Noncompliance Database (for access, contact the Spaceport Services Institutional Safety & Quality Branch, TA-C10; and filling out KSC Form 6-38NS (from http://kscforms/ or TA-C1), and attaching a risk assessment. Safety variances to higher-level documents (Agency or Federal) may require additional analysis prior to submitting to the issuing agency.

  - The appropriate program/project S&MA organization or directorate shall review and document recommended disposition (approve or disapprove) and rationale.

- Proposed safety variances shall be reviewed by the appropriate safety manager (programs include cranes and lifting equipment, explosives, pressure vessels, and lightning/grounding). If NASA employees are affected from an operational or risk exposure perspective, the American Federation of Government Employees (AFGE) Union will be notified of the safety variance.

- Final risk acceptance (approval) of safety variances against KSC documentation is generally at the program/project or organizational director level; against NASA documentation is at the Center Director level with concurrence of the Associate Director for Safety & Mission Assurance; and against other higher-level documentation is at the issuing agency level.

- The point of contact for Safety Variances is Phil Swihart, TA-C1, 867-6961.

Contractor Safety

- All contractors performing work at KSC must comply with applicable safety & health regulations (OSHA, state, Agency & Center). For purposes of OSHA compliance, the contractor is regarded as the "employer" and is therefore responsible for providing the employees and any subcontractor employees with a safe & healthful working environment.

- The major onsite performance based contracts and selection processes have embedded safety and health provisions as follows:

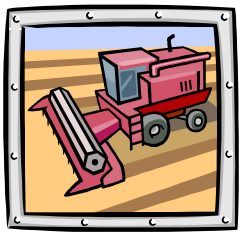
  - Safety & health past and present performance of companies are evaluated prior to selection.
  - There are extensive safety & health clauses in the contracts.
  - NASA must review and accept the contractors Safety & Health Plan prior to contract start.
  - Major contractors are required to conduct monthly safety & health reviews for OSHA record-keeping purposes.
  - Major contractors participate in KSC senior safety & health management forums, such as the KSC Safety & Health Council.
  - There are varied safety & health surveillance programs tailored to key programs and key hazardous operations.
  - Major contractors are required to have OSHA Voluntary Protection Program type programs in place, and are encouraged by NASA to seek VPP qualification.

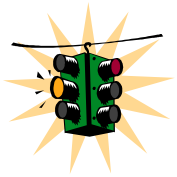
- Construction Contractors: For Construction Contracts, the following safety & health provisions are embedded:

  - Safety & health past and present performance of companies are evaluated prior to selection.
  - There are extensive safety & health clauses in the contracts.
  - NASA must review and accept the contractors Safety & Health Plan prior to contract start.
  - Pre-construction meetings are conducted to discuss safety & health issues associated with the work.
  - The contractor is required to conduct daily site inspections and submit weekly and monthly project safety & health evaluations.

- Additional on-site requirements include posting all emergency telephone numbers and a list of responsible personnel and safety points of contact, and maintaining a copy of 29 CFR 1910, 29 CFR 1960, and the "Contractor's Safety Information and Requirements" (a KSC document).

- Anyone who witnesses a safety violation by any contractor shall call the NASA Institutional Safety & Quality Branch (TA-C1) at 867-SAFE (7233).





Traffic Safety

- Employees driving motor vehicles on Center must have their vehicle properly registered, shall observe posted speed limits and all Florida DMV laws including wearing a seat belt at all times.
- Park only in authorized or designated areas, and never leave the vehicle unattended while the motor is running.
- Motor vehicle operators and bicycle riders shall yield the right of way to pedestrians.
- Bicycle riders shall observe the same rules as motor vehicles. Riding on sidewalks is prohibited.
- All pedestrians at KSC shall walk on the sidewalks when they are available, and use the crosswalks to cross roadways. Before stepping into a crosswalk and proceeding into the road, ensure that any approaching traffic is aware of your intension to cross and that they are stopped. Never assume that a vehicle will stop.
- The controlling document for traffic safety is KHB1610.1, Security Handbook. The point of contact for traffic management is Dann Oakland, 867-3008.

Section 3 – Injury & Illness Prevention

Audits and Inspections

- The Spaceport Services Institutional Safety & Quality Branch (TA-C1) performs annual safety inspections of all KSC buildings inhabited by civil service employees, and more frequent inspections for those buildings housing hazardous materials and/or hazardous operations. Corrective actions are documented and tracked using a safety and health inspection database.

- The Joint Base Operations Support Contractor (J-BOSC) performs health inspections of all KSC buildings inhabited by civil service employees in accordance with 29CFR1960. Corrective actions are also documented and tracked using the same database mentioned above.

- Safety & health inspections for buildings under the total control of contractors and where no civil servants work on a regular basis are the responsibility of the resident contractor.

- The KSC Fire Department conducts annual fire safety inspections of all buildings.

- KSC supervisors perform monthly safety inspection walk-downs. Each supervisor may take an employee with him or her during this inspection as an extra set of eyes for identifying any unsafe and/or unhealthful conditions or acts, and documents and tracks findings in the Goal Performance Evaluation System (GPES).

Unsafe and/or Unhealthful Conditions or Acts

- Always report all unsafe and/or unhealthful conditions or acts (hazards) to the lowest organizational level possible. Center personnel are encouraged to resolve safety issues within their work units whenever possible.

- If you see a situation of imminent danger, use "stop work authority" and help to determine how the work can be performed in a safe manner. All employees have the right and responsibility to call a "time out" for all situations of imminent danger, until such time that a safe way to perform the work can be determined. Imminent danger is defined as any hazard that creates a danger which could reasonably be expected to cause death or serious physical harm immediately or before the danger can be eliminated. The harm caused by the health hazard does not have to happen immediately.

- For hazards within your control, eliminate or control the hazard, if it can be done safely and if you have any required training. For example, a hazard can be eliminated by wiping up a coffee spill or wet area in the hall. Hazards are unsafe and/or unhealthful conditions that expose personnel or property to increased risk or danger. The potential for a mishap or close call exists, but nothing has actually happened. An example is a sidewalk that is buckled and uneven.

- If you see someone performing a hazardous act (unsafe and/or unhealthful act), question the person on the spot (if you can do so without further endangering that person or yourself by interrupting the task). If the work cannot be interrupted, report it to the supervisor in charge. The supervisor is responsible for assessing the situation, and to determine and implement any corrective actions.

- Supervisors shall document all corrective actions for hazards reported to them or discovered during their monthly safety & health inspections (walk-downs) in the Goal Performance Evaluation System (GPES)

- If no action is taken or you are not satisfied with the action taken, you have the following options (given in prioritized order):
  - Report through line management (Branch, Division, or Directorate).
  - Report through the line safety organization (organizational S&MA office, if one exists).
  - Call the Institutional Safety & Quality Branch (TA-C1) HOTLINE at 867-SAFE (7233).

- There may be cases, such as fear of supervisory reprisal, when employees may not wish to report hazards or hazardous acts within their organization. Fear of supervisory reprisal is a real or perceived dread or anxiety that one will be punished by one's supervisor for reporting unsafe and/or unhealthful conditions or acts.

- If, for any reason, you do not wish to report within your Directorate or through the safety organizations, if no action has been taken, or if you are dissatisfied with the action taken, you can: Fill out the "Close Calls and Unsafe and/or Unhealthful Conditions or Acts" form KDP-KSC-F-2111 in accordance with process KDP-KSC-P-2111, and send it to Spaceport Services Institutional Safety & Quality Branch (TA-C1). TA-C1 will determine who is responsible, forward it to them, and track corrective actions. Forms are located at various locations on-Center or on-line at: http://businessworld.ksc.nasa.gov/

- The position of KSC Safety Ombuds was established to ensure safety concerns not resolved through existing Center procedures and processes are communicated and resolved, and to facilitate resolution of safety issues and concerns of the workforce and resolve potentially unsafe behaviors and conditions. The KSC Safety Ombuds shall maintain requestor anonymity, when requested. You may contact the KSC Safety Ombuds, Mr. Bert Garrido, mailcode QA, at 867-1982or by email at: mailto:Bert.Garrido-1@ksc.nasa.gov

- Report safety problems or concerns through the NASA Safety Reporting System (NSRS) whenever no action has been taken locally, you are dissatisfied with the action taken, or there are extenuating circumstances, such as fear of reprisal. NSRS is confidential, voluntary, and responsive, and provides a direct channel for employees to NASA HQ/QS Safety & Risk Management Division in order to collect, evaluate & communicate safety concerns that could affect personnel/mission/operation. It also provides an independent evaluation of the concern and its associated corrective actions.
  - Do not report classified material, criminal activities, or non-safety information.
  - Pre-addressed, postage-paid NSRS forms are located throughout the Center or on-line at: http://www.hq/nasa.gov/office/codeq/nsrsindx.htm
  - Additional forms may be obtained from, and forms should be sent to: NSRS, P. O. Box 6037, Falls Church VA 22040-9824.
  - The KSC NSRS process is KDP-P-1451, which is available, on-line at Business world: http://businessworld.ksc.nasa.gov/
- The Occupational Safety and Health Administration (OSHA) - If the safety issue is still not resolved, all employees have a right to report it to OSHA. The local OSHA Office In Tampa can be reached by calling: (813) 626-1177, or call the toll-free number at: 800-321-OSHA (6742). The OSHA website is located at: http://www.osha.gov/

- Reference KDP-KSC-P-2321 and KDP-KSC-F-2111 located on KSC Business World at: http://businessworld.ksc.nasa.gov/

Close Calls

- All close calls shall be reported so that they are investigated, the root cause is identified, and corrective actions are implemented to prevent recurrence. A close call is an occurrence resulting in no injury or damage less than $1,000, but which had the potential to cause injury requiring medical treatment greater than first aid, damage of $1,000 or greater, or negative mission impact. The mere existence of a hazard does not necessarily qualify as a close call. In order to meet the definition of a close call, there must be an action associated with the hazard that had a high potential for injury or damage, even though neither occurred.

- Contractors shall report and investigate close calls in accordance with their contract.

- If you experience or witness a close call, call 867-SAFE (7233) or fill out form KDP-KSC-F-2111 and send it to Spaceport Services Institutional Safety & Quality Branch (TA-C1). TA-C1 will record the close call in the Incident Reporting Information System (IRIS) and the appropriate organization will be tasked to investigate and implement corrective actions.

- If it is determined that the close call is “highly visible” and warrants a full board investigation, a Mishap Investigation Board (MIB) will be formed. Otherwise, the responsible organization will be tasked to perform the investigation and implement corrective actions. A highly visible close call is one that that poses a high degree of programmatic impact or public, media, or political interest at the judgment of the safety director. Reference KDP-KSC-F-2111 and KDP-KSC-P-2111 located on Business World at: http://businessworld.ksc.nasa.gov/.

- Once corrective actions have been implemented, the individual that reported the close call will be provided feedback regarding the actions taken. If the individual is still dissatisfied with the actions taken, the following actions may be taken (presented in prioritized order):

  - Call 867-SAFE (7233)

- KSC has created the position of the KSC Safety Ombuds to assist in resolving safety issues or concerns that could not be resolved within the Directorates or for cases where there may be fear of reprisal. Confidentiality will be maintained if requested by the individual. The KSC Safety Ombuds is the Associate Director, S&MA/SH&IA at (321) 867-1982.

- Individuals may also report safety and health issues or concerns through the NASA Safety Reporting System (NSRS). Forms are located throughout the Center or on-line at: http://www.hq.nasa.gov/office/codeq/nsrs.

- All individuals have the right to file a complaint with the local OSHA office in Tampa by calling (813) 626-1177.

Mishaps

- For mishaps involving property damage only, report it to your supervisor. The supervisor is responsible for filling out a NASA Form 1627 and submitting it to the program/project or directorate safety office (if none exists, to Spaceport Services Institutional Safety & Quality Branch). Contractors shall submit it to their safety office.

- For all mishaps and close calls, the responsible organization shall notify the appropriate program/project or directorate S&MA organization (if none exists, notify the Spaceport Institutional Safety & Quality Branch, TA-C1). Contractor organizations shall notify their safety office.

- For serious or highly visible mishaps or close calls (death or hospitalization of personnel, damage greater than $250,000, or a highly visible event), initial reporting shall be immediately (within 1 hour). A mishap board shall be formed to investigate, determine the root cause, and determine corrective actions and any lessons learned to prevent recurrence. The applicable safety office (contractor, program/project S&MA organization or TA-C1) shall notify the Associate Director, S&MA (Safety, Health and Independent Assessment Directorate).

- For lesser mishaps and close calls, initial notification shall be within 4 hours (or by 6:45 AM the next day for shifts other than 1st shift).

- All mishaps and close calls shall be investigated to determine the root cause, implement corrective action(s), and document and share lessons learned in order to prevent recurrence.

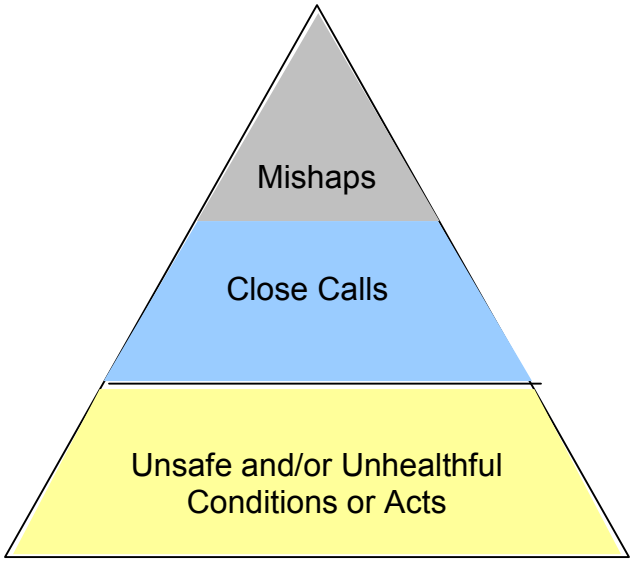
- Contractor organizations shall investigate their own mishaps and close calls in accordance with their contracts.

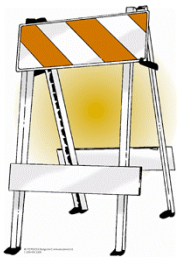
- For serious or highly visible mishaps or close calls (death or hospitalization of personnel, damage greater than $250,000, or a highly visible event), a mishap board shall be formed. The Safety, Health and Independent Assessment (SH&IA) Directorate is responsible for providing Mishap Board training, and the

Spaceport Services Directorate provides the office space and computer support required.

- For lesser mishaps and close calls that involve injury or illness of civil service personnel (first aid, medical treatment or lost time cases), the Spaceport Services Institutional Safety & Quality Branch (TA-C1) shall conduct the investigation. For lesser mishaps involving property damage only, the responsible organization shall conduct the investigation.

- The controlling documentation for mishap reporting and investigation is NPG 8621.1, NASA Procedures and Guidelines for Mishap Reporting, Investigating and Recordkeeping and KHB 1710.2, KSC Safety Practices Handbook.





General Safety & Health Requirements

- All KSC employees, contractors and visitors shall comply with all warnings, signs, barriers and alarms. Do not enter areas with warnings, barriers or flashing lights.
- Use proper lifting techniques such as keep your back straight, lift using your leg muscles, and keep the load close to your body. Do not twist your body while lifting. Request assistance with any large or heavy items.
- To help prevent slips, trips and falls, wear slip resistant shoes, use spill-proof cups and quickly clean up or barricade beverage spills. Never walk on wet floors, and report any loose flooring to your supervisor or facility manager. Immediately pick up items dropped on the floor.
- When carrying objects, do not obstruct your view.
- When ascending or descending stairways, use the handrails.
- Stay alert and do not push, shove, or “horse around”.

- Observe good housekeeping practices. Keep work areas neat and clean, and store tools, materials and equipment in their proper place. Keep aisles and hallways clear.
- Never place yourself or body parts under items being moved or under suspended loads.
- If you work with machinery, ensure that the machine guards are in place and properly adjusted, and that the equipment is in proper working order.

- Inspect all tools before each usage. Do not use defective equipment such as tools with loose connections or frayed wire.

- When working around machinery with moving parts, keep hair tied back and do not wear loose clothing that could get caught in the machine.

- Do not operate machinery or participate in hazardous operations while under the influence of medication that could impair your judgment. Use or possession of illegal drugs, fireworks, weapons, or alcohol is forbidden on the Center.

- Seatbelts should be worn at all times while operating machinery equipped with them such as forklifts, tractors, or mowers.

- Exercise caution when working in areas where there may be insects, spiders, or other animals present. Use a flashlight to check any dark areas prior to entering.

- Use stepladders to access out-of-reach items. Do not over-reach or stand on furniture or boxes.

- All civil service employees at KSC are required to take QG181KSC, KSC Safety and Health Training Package as part of their core safety and health training requirements.

Office Safety

- Maintain clean and orderly offices, rest rooms and storage areas. Minimize combustibles. Provide clear aisles and walking areas. Do not route electrical cords in aisles or walking areas.
- Evenly distribute cabinet contents to prevent tipping. Open one drawer at a time, and close after obtaining materials.
- Check office furniture for condition and functionality, especially chairs. Close desk and file cabinet drawers immediately after use. Do not stand on furniture.
- Never store or place items within 18 inches of fire suppression system sprinkler heads.
- Limited small electrical appliances for general office use and food preparation are allowed. Use only appliances that are UL listed or Facility Manager approved.
  - Use microwave ovens with caution. Never leave microwaves unattended while in use and never overcook food.
  - Unplug all appliances when not in use, except when the appliance is controlled by an internal power switch.
  - Appliances should be plugged directly into an outlet (no extension cords). Never use extension cords in place of permanent wiring.
  - Portable space heaters are prohibited unless approved and you are issued a permit by NASA Fire Services for validated medical reasons or during heating system outages.
- All civil service employees at KSC are required to take QG184KSC, Office Safety, as part of their safety and health core training requirements.

Ergonomics

- Ergonomics is the science of fitting the job to the worker.
- When there is a mismatch between the physical requirements of the job and the physical capacity of the worker, musculoskeletal disorders (MSDs) can result.
- Musculoskeletal disorders (MSDs) are the most common illness in the office workplace and represent a wide range of disorders such as carpal tunnel syndrome, tenosynovitis, tension back syndrome, and low back pain.
  - Workers are more likely to develop a MSD when they face one or more of the following risk factors:
    - Repeating the same motion throughout their workday
    - Performing their work in an awkward position
    - Using a great deal of force to perform their job
    - Repeatedly lifting heavy objects
- Report MSD signs and symptoms to the OHF
    - Signs of MSDs include reduced grip strength, decreased range of motion, inability to do everyday tasks, and fingers or toes turning white (blanching)
    - MSD symptoms can vary from mild periodic symptoms to severe illnesses including painful joints, back or neck pain, burning, tingling, numbness, stiffness, swelling or inflammation and pain that wakes you up.
  - All civil service employees at KSC are required to take QG182KSC Ergonomics Safety as part of their core safety and health training requirements.
  - At KSC the Joint Base Operations Support Contractor (J-BOSC) Industrial Hygiene (IH) Office will provide consultation on workspace modification to eliminate ergonomic problems. Call 867-2400.

Indoor Air Quality

- Indoor Air Quality Surveys are conducted to determine and evaluate the potential for employee exposure(s) to materials related to indoor air quality.
- Areas of concern include, among others, carbon dioxide levels, dust levels, mold growth, water damage, structural damage, etc.
- A survey may also be performed to determine if facility HVAC systems are adequate to supply sufficient fresh outside air to the facility.
- Employees may request a survey of the air quality of their work area by calling Environmental Health at 867-2400.

Food Safety

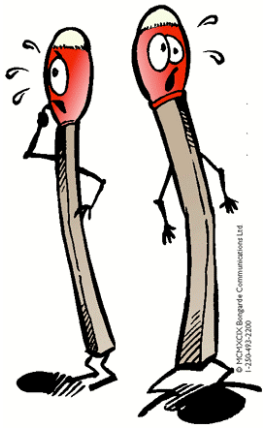
- The KSC Sanitation Program assures that all food served or vended for consumption is stored, handled, prepared, and dispensed in a clean and wholesome manner and is consistent with U. S. Dept. of Health and Human Services, Public Health Service Food and Drug Administration's (FDA) Food Code and applicable regulations of the State of Florida.

- KSC Organizations storing, preparing, transporting, or serving food must meet minimum acceptable requirements for safe food handling. In addition, they are required to discard suspect food items in the event of an emergency such as a fire, flood, power outage, or similar event which might result in the contamination of food, or that might prevent potentially hazardous food from being held at safe temperatures.

- KSC Organizations operating vending machines must assure that foods are properly labeled and are removed prior to expiration, and that machines are functional and clean.

- All food handlers receive initial and annual refresher training on the principles and practice of food service sanitation in order to maintain certification. Food service employees with symptoms or exposed to certain infections or communicable diseases must report to the OHF for evaluation, and report to the OHF prior to returning to work after being absent due to illness.

- If you suspect a problem regarding food safety, contact the KSC Sanitarian, Burt Summerfield, at 867-6397.



Smoking

- At KSC, all buildings and facilities are smoke-free, including KSC leased GSA vehicles. In addition, smoking in front of air intake ducts of facilities under NASA/KSC control is prohibited. Smoking is conditionally permitted in outdoor areas where smoking is not prohibited to ensure personnel and operational safety or for fire prevention.
- Discard smoking material only in designated receptacles. Exercise special caution when dry weather conditions exist.
- Facility Managers are responsible for determining designated smoking areas outside of the building exits. Some building and facility exits are designated as non-smoking.
- There are smoking cessation programs available at KSC through the Employee Assistance Program (EAP) at the OHF. Call 867-7398.
- The controlling documentation for smoking policy at KSC is KMI 1216.1, Smoke-free Workplace.

Animal Safety

- KSC is located in a National Wildlife Refuge. There are many animals such as wild hogs, snakes, alligators and insects of all kinds out there.
- The most important thing to remember about wild animals is to avoid contact Do not approach or touch them, and never feed them.
- Exercise caution when working in areas where insects and spiders may be present. Use a flashlight to check dark areas first.
- Be aware of animals that may dart in front of your car when you are driving, such as hogs, alligators, raccoons, and opossums. Maintain lower speeds at dawn, at dusk, and at night.
- For assistance with any nuisance animal (including birds nesting in a bad location): Call the U. S. Fish and Wildlife Office at 861-0667. If you cannot reach anyone (i.e. after hours), call the Duty Officer at 853-5211.

Safety Permits

- The practice of issuing permits for certain hazardous types of work ensures that safe operating procedures exist, the use of any personal protective equipment (PPE) is in place, and that any specialized training and/or experience requirements are met.

- The following safety permits may be obtained by calling the Duty Officer at 853-5211 (24 hours a day; 24 hours advanced notice is requested):
  - Confined space work permit (KSC Form 16-287)
  - Burn permit (KSC Form 2-13) for using propane/acetylene torches, heat guns, grinders, and arc welders. Burn permits for welding and grinding are only required for operations outside of approved shops.
  - Excavation permit (KSC Form 26-312)

- The following types of hazardous work also require usage permits and are obtained through the specific program:
  - Explosives. (The point of contact is Jim Fowler, TA-C1, 867-6959)
  - Ionizing Radiation, which includes radioactive sources and radiation producing devices. (The point of contact is Randy Scott, TA-C2, 867-6958)
  - Non-ionizing Radiation, such as hazardous levels of Radio Frequency (RF) radiation, lasers, and optical devices. (The point of contact is Randy Scott, TA-C2, 867-6958)

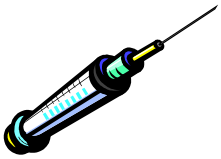
Asbestos Safety

- Do not cut, sand, polish or remove materials potentially containing asbestos. At some locations at KSC, you will see signage indicating that materials "does not contain asbestos" or "may contain asbestos". Materials that "may contain asbestos" that are in good condition (undamaged) are considered safe.

- It is KSC Policy to maintain on-site Asbestos Containing Material (ACM) in good, undamaged condition.

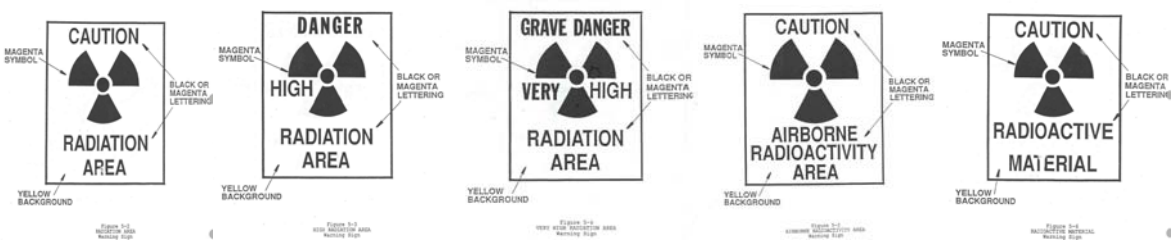
- Only personnel with special training shall remove asbestos, to ensure that ACM's are not disturbed in any manner that would create dust or debris.

- Environmental Health maintains a database of asbestos locations in facilities at KSC so that precautions can be taken to work safely. When projects involve facilities that may contain asbestos, the project managers must closely coordinate the work with Environmental Health. The database may be accessed at http://sgs.ksc.nasa.gov/sgs/sites/other/chs/ehs/fams/. The point of contact for asbestos safety is John Sherwood, 867-1210.



Blood-borne Pathogens

- Many illnesses & diseases such as HIV and Hepatitis B are transmitted by contact with blood or other body fluids.
- Exercise caution if you choose to assist the injured, and prevent contact with blood and other body fluids. Employees should also avoid being punctured with used needles and avoid direct contact with open wounds.
- Do not clean areas that are contaminated with blood or other body fluids. Center emergency response personnel and special Center janitorial personnel are trained in proper clean up and disposal. Call the J-BOSC Duty Office at 853-5211.
- In the event of accidental contact, contact the Occupational Health Facility at 867-3347.



Ionizing Radiation Safety

- Ionizing radiation consists of radioactive sources or radiation-producing devices. Use of radioactive materials or radiation-producing machines requires compliance with rules and regulations set forth by KSC, NASA and federal codes of the Nuclear Regulatory Commission (NRC) and OSHA. All KSC users shall abide by these requirements.

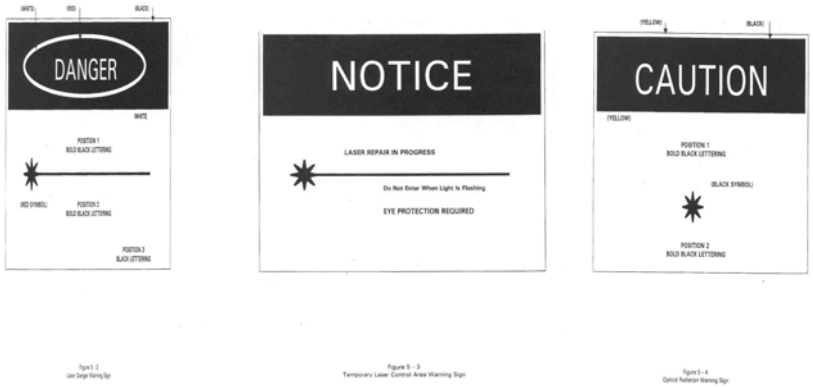
- It is KSC policy to never exceed permissible personnel exposure limits and to keep radiation levels "as low as reasonably possible (ALARA). To avoid unnecessary exposure, all unauthorized personnel shall stay out of all controlled radiation areas. Entry of non-essential personnel into these operational areas is prohibited.

- All procurement, possession, and use of ionizing radiation sources or ionizing radiation-producing devices and specific user authorization require coordination with the KSC Radiation Protection Officer (RPO) and approval by the KSC Radiation Protection Program.

- The KSC forms associated with ionizing radiation are:
  - KSC Form 16-295, Radiation Use Request/Authorization (Radioactive Materials)
  - KSC Form 28-34, Radiation Use Request/Authorization (Ionizing Machine/Device)
  - KSC Form 16-294, Radiation Training & Experience Summary (Ionizing Radiation)
  - KSC Form 16-353, Modification of Radiation Use Authorization

- All ionizing radiation areas are identified, posted and restricted to prevent unnecessary exposure to personnel. Operations involving hazardous ionizing radiation levels require additional controls such as housings and/or interlocks, personal protective equipment, and approved operational and emergency procedures.

- Report any mishap or close call involving hazardous ionizing radiation exposure or potential for exposure to the Radiation Protection Officer (RPO) immediately at 867-6958.



Non-Ionizing Radiation Safety

- Non-ionizing Radiation consists of Radio Frequency (RF) and microwave, lasers, and ultraviolet, infrared, and visible light. Use of hazardous non-ionizing radiation requires compliance with requirements established by KSC, NASA, the State and consensus and federal standards. All KSC users shall abide by these requirements.

- It is KSC policy to never exceed permissible personnel exposure limits and to keep radiation levels "as low as reasonably possible (ALARA)". To prevent unnecessary exposure of personnel to non-ionizing radiation, all forms of hazardous non-ionizing radiation must be reported to the KSC Radiation Program.

- Procurement, possession, and use of hazardous non-ionizing radiation (such as lasers and optical radiation devices) and specific user authorization require approval through the KSC Radiation Protection Program.

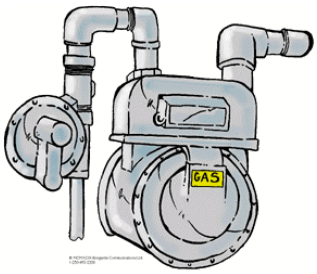
- The KSC forms associated with hazardous non-ionizing radiation are:
  - KSC Form 16-447, Laser Device Use Request/Authorization
  - KSC Form 28-626, Non-laser Optical Use Request/Authorization
  - KSC Form 16-450, Training & Experience Summary for Non-ionizing Radiation Users
  - KSC Form 16-353, Modification of Radiation Use Authorization

- Operations involving hazardous non-ionizing radiation levels (lasers, optical devices, etc.) require additional controls such as operational hazard areas, housings and/or interlocks, personal protective equipment, and approved operational and emergency procedures.

- Specific safety measures for operating laser systems include safety eyewear, protective housing, and safety interlocks. Never disable an interlock system, look into a laser beam, point a laser beam at a person or reflective surface, and never leave an operating system unattended.

- Some ferromagnetic tools or medical devices such as implants, cardiac pacemakers, staples, aneurysm clips, and prostheses may be affected by the magnetic fields produced by non-ionizing radiation. All personnel having such devices shall avoid hazard areas with resulting magnetic fields.

- Report any mishap or close call involving hazardous non-ionizing radiation exposure or potential for exposure to the Radiation Protection Officer (RPO) immediately at 867-6958.



Pressurized Systems

- There are hundreds of pressurized systems at KSC such as propellant tanks, cryogenic dewers, fluids and gasses under pressure, water deluge systems, and common “K” bottles. Pressure systems consist of pressure vessels, lines or pipes, fittings, flex hoses, gauges, valves and the fluid itself.

- The hazards that can be associated with pressure systems consist of:
  - Rapid energy release resulting in excessive forces in the form of debris or projectiles, such as a ruptured pressure vessel;
  - Unexpected mechanical motion, such as flex hose whipping action;
  - High noise levels due to venting and high rate of flow;
  - And the hazards associated with the fluid itself such as high temperatures (steam, hydraulic fluid), low temperatures (cryogenics), explosions, toxicity, and asphyxiation due to fluid release.

- Safety precautions that should be followed when working with pressurized systems include:
  - Follow procedures.
  - Know the contents of the system, read the Material Safety Data Sheet (MSDS) and be familiar with emergency procedures.
  - Restrain flex hoses
  - Verify that the system is depressurized prior to disassembly, and use lockout/tagout procedures to ensure that the energy is contained.
  - Never assume low-pressure systems are safe. Even low pressure (under 150 pounds/square inch or psi) can be hazardous if there are large volumes or hazardous fluids or gas present.

- Specific training is required to work on pressurized systems.

- All high pressure (above 150 PSI) vessels shall be designed and fabricated in accordance with ASM Codes and Standards and must be labeled with the maximum allowable working pressure (MAWP) in psi.

Confined Space

- A Confined Space is a workspace not intended for continuous human occupancy, has limited means of entry and exit, and is subject to accumulation of a hazardous atmosphere, lack of oxygen or contains other potential hazards to personnel. In accordance with OSHA regulations, all confined spaces must be labeled.

- Examples of confined spaces include tanks, manholes, sewers, vents, tunnels, vaults, test chambers, pipelines, aircraft compartments, etc.

- If you have not been trained specifically for confined space entry, contact your safety office prior to proceeding.

- Requirements for confined space entry vary with location and hazards, but generally require:
  - Periodic or continuous monitoring,
  - A dedicated safety monitor just outside the confined space,
  - A means of emergency extraction,
  - Forced ventilation, and
  - Record keeping

- A Confined Space Work Permit (KSC Form 16-287) is required for any work in a permit-required confined space, unless covered by a written hazardous operating procedure that specifies the requirements normally contained in the permit.

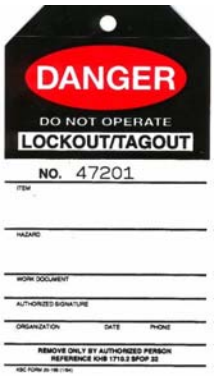
- The controlling document for confined spaces at KSC is KHB 1840.1. For specific requirements or questions about confined space entry, call Environmental Health at 867-2400.

Ladders

- For portable non-self supporting ladders - The horizontal distance from the top support to the foot of the ladder is ¼ of the working length of the ladder.
- Do not stand on the top two steps of the ladder (or follow the manufacturer labeled recommendations).
- Ascend and descend ladders facing the ladder.
- Only use ladders that are stable and in good shape.
- Use only wood or fiberglass ladders around electrical hazards.
- Do not over-reach on ladders. Adjust the ladder, or get a higher one.
- Do not use cable trays meant for electrical wiring as ladders. Always use the proper tool for the job.
- To avoid displacement, barricade ladder work areas if they must be in an area of other activity.

Scaffolds

- Wear hard hats when working on or around scaffolding unless otherwise prohibited.
- Maintain 3 points of contact when ascending or descending a scaffolding ladder.
- Never work on a scaffold until a competent (trained) person has inspected it. A competent person is also required to inspect the scaffold prior to each work shift.
- Fall protection (railings or full body harness) is required when working on scaffolding greater than 10 feet high.
- Never exceed the intended load of scaffolding.



Lockout/Tagout

- When performing repair or maintenance, energized systems (such as electrical, mechanical, gaseous or liquid systems) shall be locked out and tagged out in order to protect employees from accidental machine start-up or unexpected energy release.
- Only authorized employees shall lock and tag equipment, or remove locks and tags and return equipment to service. Unauthorized personnel shall never tamper with locks and tags or try to operate locked or tagged equipment.
- Tags shall be legible and contain a point of contact.
- Locked and tagged equipment shall be listed on the lockout/tagout control log. If you are not familiar with the lockout/tagout requirements, contact your safety office prior to conducting the work.

Laboratories

- All employees that work in laboratories with hazardous chemicals shall be provided information and training to ensure that they are apprised of the hazards of chemicals present in their work area.
- If employee exposure levels to substances in the laboratory are expected to routinely exceed the action level or, in the absence of an action level, the Permissible Exposure Level (PEL), the employer shall measure the employee's exposure to any substance regulated by a standard which requires monitoring.
- All laboratories with hazardous chemicals are required to have a chemical hygiene plan that is capable of protecting employees from health hazards associated with hazardous chemicals in that laboratory and capable of keeping exposures below the action level (or PEL, if none). The chemical hygiene plan shall:
  - Be accessible to all employees
  - Contain standard operating procedures for work with hazardous chemicals
  - Contain criteria for using control measures such as engineering controls, personal protective equipment (PPE) and hygiene practices
  - Provide measures to ensure proper functioning and cleanliness of protective equipment (such as respirators or fume hoods)
  - Contain provisions for medical consultation and medical examinations when appropriate
  - Contain provisions for training.
- All employees in a lab with hazardous chemicals shall have access to and receive training on information contained on the manufacturer supplied Materials Safety Data Sheet.
- The KSC Chemical Hygiene Officer is Mike Cardinale, 867-6342.

Personal Protective Equipment (PPE)

- PPE is required when engineering controls are not adequate to protect personnel. For new operations, call Comprehensive Health Services (CHS) for an assessment .

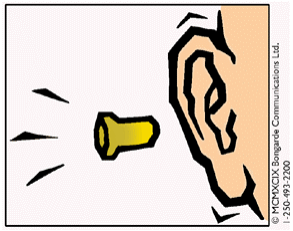
- The supervisor/employer is responsible for providing adequate PPE.

- Employees required to use PPE shall:

  - Receive training on proper use of PPE.
  - Inspect PPE prior to use for damage and cleanliness
  - May require fit tests for proper sealing of respirators.

- Types of PPE:

  - Head Protection (Hard Hats) - Provides protection from overhead hazards and must be worn in areas where overhead hazards are present.
  - Eye & Face Protection (safety glasses, face shields, chemical goggles, welding shields) - Provides protection from flying dirt, debris, and radiation or chemical burns. Prescription glasses with side shields are available to civil servants needing them for their job.
  - Hearing Protection - Provides protection from hazardous noise. High noise areas requiring hearing protection must be posted.
  - Foot Protection (Safety Shoes) - Provides protection from falling or moving objects and electrical equipment.
  - Hand Protection - Provides protection from mechanical hazards (sharp edges, crushing hazards, chemical burns). Wear for handling rough material and chemicals.
  - Respiratory protective equipment (Respirators) - Protects from hazardous fumes, vapors, or particulates.
  - Fall Protection (full body harness) – Provides protection for workers at elevated heights over 6 ft. The approved harness is the full body style with shock absorbing lanyard.



Hearing Loss Prevention

- The goal of the KSC Hearing Loss Prevention Program (KHB 1820.3) is the prevention of work-related hearing loss. The KHB defines noise exposure limits, noise hazard assessments, engineering and administrative controls, hearing protection devices, medical surveillance, posting of noise hazard areas, training, and records management.

- Hazardous noise may be continuous (such as the noise of a lawn mower) or impulsive/impact (such as the noise of a pistol shot or pile driver). Exposure levels for continuous noise are determined by a combination of sound level intensity versus exposure duration. Exposure levels for impulse/impact noise are a combination of sound level intensity and the number of impulses/impacts per day.

- All personnel are required to wear hearing protection in posted hazardous noise areas when noise is present or when performing work where the allowable noise exposure limits may be exceeded.

- Noise Exposure Limits

  - Continuous noise: The noise exposure limit for an employee is an eight-hour time weighted average (TWA) of 85 decibels (dBA), or its equivalent dose based on noise intensity and duration of exposure. Unprotected exposure to continuous noise at or above 115 dBA is not allowed for any duration.

  - Impulse/Impact Noise: No exposures in excess of 130 dBA peak sound pressure level are permitted, regardless of whether hearing protection is used or not.

- Hearing Conservation Program Enrollment: An employer must enroll personnel in a medical surveillance program if their routine (30 days or more per year) noise exposure equals or exceeds the KSC action level of 80 dBA 8-hr. TWA or 50% of the allowable noise dose, regardless of use of hearing protection. Employees in the program undergo an examination by a qualified physician and receive a baseline audiogram with annual audiograms thereafter.

- Each employee who participates in the Hearing Conservation Program is required to attend annual training. Supervisors of personnel participating in the Hearing Conservation Program are also required to receive hearing conservation training.

- Facilities and equipment shall be procured, designed, operated and/or modified to the lowest levels possible. If engineering controls fail to reduce sound levels below allowed exposure limits, a combination of administrative controls of protection (access/exposure controls) and hearing protection devices must be used.

- When noise levels routinely equal or exceed 85 dBA 8-hr TWA, warning signs which clearly indicate the hazard of high noise levels and state the requirement to wear hearing protection will be posted at the entrances to the area.

- Hearing Protection Devices

  - Hearing protection devices consist of earmuffs and earplugs. These are for individual use only and may not be traded or shared. A combination of both earmuffs and earplugs is required for conditions of 100-dBA 8-hr. TWA or equivalent dose, and exposure of any duration greater than 110 dBA.

  - Special hearing protection equipment, such as sound-suppression communications and active noise reduction headsets may be used in hazardous noise environments.

- Work area supervisors are responsible for scheduling noise hazard assessments for operations where noise may be a hazard to personnel. Comprehensive Health Services (CHS) Environmental Health (867-2400) may be contacted to schedule a hazard assessment. The CHS Noise Hazard assessment will identify required use of PPE, employee training, and Hearing Conservation Program enrollment.

- Employees are responsible for notifying supervisors of any work areas, operations or equipment that may be a noise hazard.

- Any questions concerning the KSC Hearing Loss Prevention program should be directed to the NASA Civil Service Hearing Conservation Officer (HCO) Mike Cardinale, 867-6342.

Respiratory Protection

- The KSC Respiratory Protection Program (KHB 1820.4) establishes guidelines for the use of respiratory protective equipment at the Kennedy Space Center and the Cape Canaveral Air Force Station (KSC/CCAFS). The KHB describes practices and procedures where the use of such equipment is required to perform tasks that are inherently hazardous because of the presence of toxic air contaminants and/or oxygen deficient atmospheres. These guidelines are applicable to all NASA civil service and contractor organizations as well as their subcontractors.

- KSC Respiratory Protection Program provides guidance on the selection and use of air-purifying respirators, air-supplied respirators and emergency escape respirators, as well as policy for written operating procedures, hazard assessments for respirator use, breathing air quality, medical screening for users, and employee training.

- Adequate respiratory protection shall be provided whenever personnel work in:

    - Hazardous atmospheres where the action level of the contaminant is exceeded or oxygen deficient atmospheres are present.

    - Handling, transfer, or use of hazardous chemicals where the toxicity is of such a nature as to pose significant risk of serious illness or injury in the event of a leak, spill, or other release of the chemical.

    - Atmospheres with unknown concentrations of air contaminants or oxygen.

    - The action level of contaminant(s) could be exceeded, as determined by a safety professional or industrial hygienist.

- Respiratory protection may be required when any information, observation, or calculation shows that an employee may be exposed to oxygen-deficient atmospheres and/or air contaminants above their action levels. This includes, but is not limited to, data from monitoring of similar operations, procedure reviews, potential for skin and eye contact, and employee complaints of unusual odors, irritations, or other signs or symptoms of potential exposures.

- The JBOSC Environmental Health contractor provides KSC Civil Service and contractor safety organizations hazard assessments of operations and procedures that may require use of respiratory protection. These hazard assessments identify when respirator use is required as well as the selection of the appropriate respirator for the job.

- All personnel that are required to use respiratory protective equipment must have a medical certification to use an air-purifying or air-supplied respirator. Annual training is mandatory to maintain certification and includes a fit test to ensure proper protection is provided for the assigned respirator.

- Respirators undergo periodic preventive maintenance such as inspection, cleaning and repair.

- Any questions concerning the KSC Respiratory Protection program should be directed to Mike Cardinale, 867-6342 or the appropriate contractor safety organization.

Section 4 – Hazardous Materials

Hazard Communications (HAZCOM)

- The purpose of the KSC HAZCOM program is to provide information on the hazards of chemicals in the work place, and how to use them safely.
- Employees have the right to know about the hazards of their work and how to protect themselves.
- All civil service employees at KSC are required to take QG160KSC Hazcom Training (awareness) as part of their core safety and health training. Employees that work with or around hazardous materials or chemicals must take additional, specialized training depending on what chemicals they work with or around.
- All hazardous chemicals or materials must be properly identified and labeled. The manufacturer label is in compliance as long as it is not defaced or damaged. If you need to re-label, you must address all of the requirements set forth in 29 CFR 1910.1200.
- Material Safety Data Sheets (MSDS's) for all chemicals in the work area must be readily available. Read and understand all MSDS's for the chemicals you are working with. This includes being knowledgeable about emergency procedures and emergency medical treatment. MSDS's are available on-line at: http://MSDS

Cryogens

- Cryogens are liquids that boil at temperatures below –238 degrees Fahrenheit. Examples of cryogens found at KSC include:
  - Liquid oxygen (LOX or LO_2, boiling point –298° F) used by the Shuttle as an oxidizer.
  - Liquid hydrogen (LH_2, boiling point –423° F) used by the Shuttle as a fuel.
  - Liquid Air (boiling point -318 ° F) is used for breathing apparatuses.
  - Liquid Nitrogen (LN_2, boiling point –320.4 ° F) is used primarily for purging.
  - Liquid Helium (LHe, boiling point –452.1 ° F) is used primarily for leak checks and purging.
- Hazards due to exposure or contact include frostbite and asphyxiation.
- Personal Protective Equipment for working with cryogens includes gloves, coveralls and face shields.
- Specific training is required to handle cryogens.

Hypergols

- Hypergols are fuels and oxidizers that ignite spontaneously upon contact with each other. No ignition source is required.
- Hypergols are extremely toxic and corrosive. Hypergol storage is a fairly challenging task requiring specialized facilities.
- Hypergols are used to propel/maneuver spacecraft. In the Shuttle Orbital Maneuvering and Reaction Control Systems, monomethyl hydrazine (MMH) is the fuel, and Nitrogen Tetroxide (N_2O_4) is the oxidizer. Both are highly toxic.
  - MMH is a clear compound and has a "fishy" ammonia smell.
  - N_2O_4 is a reddish-brown fluid and has a pungent "bleach" smell.
- PPE requirements may vary depending on the job being performed, but may include full Self Contained Atmosphere Protective Ensemble (SCAPE).
- Hypergols are present at multiple facilities and areas at KSC, such as the Orbiter Processing Facility (OPF), pads 39A & B, the Hypergol Maintenance Facility (HMF), the Spacecraft & Assembly Encapsulation Facility (SAEF), and the Vertical Processing Facility (VPF).
- In emergency response to hypergol releases, be sure to check the wind socks and evacuate upwind and crosswind.

Anhydrous Ammonia

- Anhydrous ammonia (NH_3) is used as a refrigerant for spacecraft cooling, including the International Space Station (ISS).

- Ammonia is normally a gas, but pressurizing it will make a liquid. Liquid ammonia is colorless and has a pungent odor. Contact with liquid ammonia causes cryogenic burns.

- Gaseous ammonia is colorless, lighter than air and has a penetrating odor. It has an affinity for water, and is extremely irritating to the skin, eyes, nose, and throat.

- Ammonia operations are fairly common at the KSC Space Station Processing Facility (SSPF). During these operations there may be planned ammonia venting as well as the possibility of ammonia leaks. Personnel in this area should be aware of the following facts:

  - The anhydrous ammonia being processed is much more potent than dilute solutions of household ammonia.
  - The safe permissible exposure levels (PEL's) established by the American Conference Of Government Industrial Hygienists (ACGIH) is 50 PPM (parts per million) for 8 hours per day, and for 5 consecutive days.
  - The odor is normally detected at 1 to 2 PPM.
  - If you smell ammonia vapors near the SSPF during ammonia operations, leave the area immediately and notify Boeing Operations at 867-5800.

- Ammonia is flammable and explosive.

- Special training and operating procedures are required to conduct operations that use ammonia.

- Personnel performing ammonia operations or working on ammonia-associated equipment must always use the proper hardware in order to prevent leaks.

- PPE requirements vary depending on the job being performed, but may include gloves, boots, apron, goggles, face shield, and air purifying or supplied air respirators.

Explosives and Propellants

- Explosives are any chemical compound or mechanical mixture that, when subjected to heat, impact, friction, detonation, or other suitable initiation, undergoes a very rapid chemical change with the evolution of large volumes of highly heated gases that exert pressures in the surrounding medium. The term explosion generally implies an uncontrolled detonation of high explosive material.

- Solid and liquid propellants and fuels including cryogens, hypergols and pyrotechnics are chemical substances that undergo a rapid, controlled reaction or deflagration for the primary purpose of propulsion or power. A propellant that is confined may transition to a detonation or explosion. Examples are:

  - Pyrotechnic devices, such as explosive bolts, initiators and linear shaped charges.

  - Solid propellant, such as the fuel in solid rocket boosters (SRBs).

  - Liquid propellant, such as liquid hydrogen & oxygen in the Shuttle external tank (ET).

  - Hypergolic propellants, such as nitrogen tetroxide, mono-methyl hydrazine, hydrazine and hydrogen peroxide greater than 90%.

- Explosive, propellant, & pyrotechnic operations shall be conducted in a manner that exposes the minimum number of people, to the smallest quantity of explosives, for the shortest period of time.

- Explosive safety protection factors include:

  - Explosives, propellants and pyrotechnics shall be protected from inadvertent initiation (heat, friction or shock).

  - People, equipment, facilities and the environment shall be protected from blast overpressures, flying fragments and high temperatures through safety clear zones, shielding and personnel protective equipment.

- Explosives and propellants must always be stored in lightning protected areas.
- Explosives and propellants must always be accounted for and must never be left in an unsecured area.
- Protection must be provided from other explosives by compatibility groupings, separation distances and substantial dividing walls.
- Only certain buildings/areas are designated explosives handling facilities and are labeled as such.
- Cell phones and 2-way radios are prohibited within 25 feet of explosives and propellants.

- Within the explosives or flammable liquid operational hazard areas, the following items or conditions are restricted or not allowed:
  - Cell phones, 2-way radios, or talk back pagers (within 25 feet)
  - Ignition sources including vehicles powered by internal combustion engines.
  - Smoking or smoking materials such as matches and lighters.
  - Oxygen rich environments.
  - Electrical lockout, lightning protection, bonding and grounding, and low humidity minimums shall be used to prevent electrostatic discharge in explosives or flammable liquid operational areas.
- Specific training is required to handle pyrotechnics.

Major Chemical Hazards

	ACGIH TLV	IDLH	HAZARD	DESCRIPTION
Monomethyl hydrazine (MMH) (CH_4N_2)	.01 PPM 1.7 PPM Odor	20 PPM	Corrosive, Toxic, Flammable	Propellant Clear, colorless liquid Ammonia smell (Amine)
Hydrazine (N_2H_4)	.01 PPM 1.7 PPM	570 PPM	Corrosive, Toxic, Flammable	Fuel component Clear, colorless liquid Ammonia, fishy smell
Nitrogen Tetroxide (N_2O_4)	1 PPM	200 PPM	Corrosive, Toxic	Oxidizer Reddish-brown liquid Pungent bleach odor
Ammonium Perchlorate (NH_4ClO_4)	None Odorless	No data	Strong Oxidizer, Mild irritant	Oxidizer White granular crystals
Anhydrous Ammonia (NH_3)	25 PPM 1-5 PPM Odor	2000 PPM	Corrosive, Toxic, Flammable	Coolant Clear, colorless gas Pungent odor
Liquid Hydrogen (LH_2)	None Odorless	Non-toxic Non-corrosive	Cryogenic, Extremely Flammable, Asphyxiant	Cryogenic liquid (fuel) Clear, colorless
Liquid Oxygen (LOX or LO_2)	None Odorless	Non-toxic	Cryogenic Supports combustion	Cryogenic liquid (oxidizer) Clear or pale blue
Liquid Air	None Odorless	Non-toxic	Cryogenic	Cryogenic Colorless
Liquid Nitrogen	None Odorless	Non-toxic	Cryogenic Asphyxiant	Cryogenic Colorless
Liquid Helium	None Odorless	Non-toxic	Cryogenic Asphyxiant	Cryogenic liquid Colorless

TLV – Threshold Limit Value
ACGIH – American Conference of Government Industrial Hygiene;
PPM – Parts Per Million
IDLH – Immediately Dangerous to Life and Health

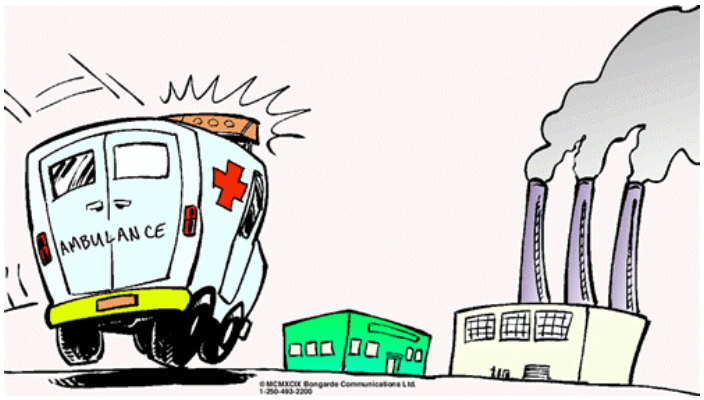
Section 5 - Emergencies

Reporting Injury, Illness and Emergencies

- To report all emergencies and any injury or illness that requires prompt medical attention, **call 911 on a Center phone or 867-7911 on a cell phone**. Examples of emergencies are fires, facility damage, explosions, bomb threats, suspicious packages, vehicle accidents, situations with potential for workplace violence, and chemical spills or releases.

- To receive medical attention for minor illness or injury or suspected chemical exposure, notify your supervisor and report to the Occupational Health Facility (OHF).

- Off-shift medical care requirements are handled though the Emergency Medical Services, which are to be dispatched through the Center-wide 911 system. If non-urgent medical attention is required, the patient may elect to go to a local hospital or other facility to receive medical attention, or may elect to report to the KSC medical facilities the next day.



Emergency Notification and Response

- **Facility fire alarms** consist of loud, continuous bells ringing. When you hear the facility fire alarm, evacuate to the closest exit and report to your marshalling area, or 200 feet upwind from the facility. Supervisors have established marshalling areas in order to account for their personnel during emergency evacuations.

- **Area warnings** consist of a warbler sound and indicate there is danger in the area. When you hear an area warning, evacuate the area and report to the marshalling area.

- **Tornado warnings** are a 3 to 5 minute steady siren and personnel should seek shelter immediately in a substantial building and keep away from doors and windows. Automobiles are not effective shelter from a tornado.

- **The Emergency Alert System (EAS)** is a buzzer-type noise on television or radio. All personnel shall listen and follow emergency instructions.

- **The Public Address (PA) System** is used to announce weather related conditions, chemical releases and other emergencies.

- **Flashing lights** in facilities indicate hazardous operations.

  - A flashing **amber** light indicates that hazardous operations are underway. Only personnel essential to the operation should be present. Do not enter.

  - A **red** flashing light indicates an emergency situation and all personnel should evacuate the facility.

- A **blue** flashing light indicates that radio frequency (RF) waves are being transmitted and non-essential personnel should not approach.

- During emergencies, only emergency response personnel shall be allowed access to the scene while the area is still considered unsafe. All other personnel shall stay outside of the area perimeter established by the incident commander until the "all clear" is given, and follow all instructions.

- When evacuating for potential chemical releases, move upwind and/or crosswind from the potential source. Use windsocks to determine wind directions.

- **For all emergencies, dial 911or 867-7911 on cell phones**.

Call

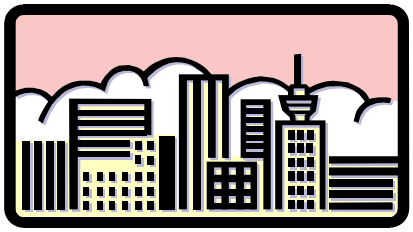
911 **OR** **867-7911**

Fires & Explosions

- Report fires or abnormal smoke in facilities by using the manual fire alarm pull stations and by calling 911 (or 867-7911 if using a cell phone).
- Verbally warn personnel in the immediate area and promptly begin evacuation to the closest exit. Use the stairs (DO NOT USE ELEVATORS).
- Assist any physically impaired co-workers (“Buddy System”) in exiting the building or reaching a safe area remote from the fire and near an exit stairway.
- If possible, close doors to work area upon leaving, but do not waste time shutting down equipment or collecting personal items. Feel all closed doors before opening to determine if it is safe to open.
- In the event of an explosion, watch for falling objects, be prepared for possible further explosions, and avoid proximity to windows, overhead fixtures, file cabinets, bookcases, and electrical equipment.
- Proceed at least 200 feet away from the building and away from the street/entrance to the building. Emergency personnel will need this space to properly respond to the incident.
- Once you are in a safe area, call 911 (867-7911 on a cell phone) and report any details you may know of to assist emergency personnel response.
- Report to your established marshalling area and to your supervisor, and remain there until the “all clear” or other instructions are issued. Supervisors shall notify emergency response personnel of employees that are believed to be still inside the building.
- The Facility manager (or designee) will report to the Incident Commander and provide any additional details on the incident. This action should be performed as soon as possible.

Chemical Spills/Releases

- In the event of a spill of any hazardous material:
  - **Dial 911 (867-7911 for cell phones at KSC)** and specify **emergency** if the spill could result in a fatal, imminently fatal, or acute illness injury; if it involves fire, explosion, or personal injury; or if it could adversely impact public health, the environment, or property. D**ial 911 (867-7911 for cell phones at KSC)** and specify **non-emergency** if the spill is contained; or if the spill can be controlled by shop personnel with existing training and protective equipment capabilities. Cleanup support may be required.
  - Call the J-BOSC Duty Office (853-5211) if the spill is minor and incidental to operations; and/or has been or is being cleaned up by site personnel.
- The following steps should be taken as appropriate:
  - Activate area alarms and, if evacuation is required, evacuate the area.
  - Dial 911 (867-7911 on a cell phone) or call the J-BOSC Duty Officer at 853-5211.
  - Notify the area supervisor.
  - Terminate the operation and stop the source of the spill or leak, without risk of injury.
- The following information should be provided with notification:
  - Location of the release.
  - Extent of injuries, fire, and/or explosions.
  - Substance & quantity released.
  - Potential risk to human health or the environment, if possible.
  - Need for cleanup assistance.
- Pollution Incident Report (KSC form 21-555) - A pollution Incident Report must be completed for all chemical releases and faxed within 24 hours to J-BOSC Waste Management at 867-7737.



Launch Shelters

- If an emergency associated with a launch occurs (launch contingency), all buildings at KSC, except trailers and modular buildings, are designated as launch shelters.

- If you are directed to shelter, remain in shelter until given an “All Clear” at your area/facility by a competent authority. If required, contingency support teams will be dispatched to facilities that are inside a potential plume corridor to shut down air conditioning/ventilation systems.

Emergency Safety Equipment

- Emergency Life Support Apparatus (ELSA)
  - ELSA is a temporary life support breathing apparatus intended for emergency evacuation from an area where toxic chemicals are used.
  - If you work in an area where toxic chemicals are present, ELSA units will be located throughout the area in green & white striped boxes for your use during emergencies.
  - ELSA(s) come in 5-, 7-, and 10-minute units.
  - Specific training is required for the use of ELSA(s), and for admittance to areas where toxic hazards are located.
  - Emergency evacuation procedures for such facilities shall include ELSA usage.
- Other required emergency equipment in areas where chemical or, in some cases, particulate hazards are present are:
  - Safety Showers
  - Emergency eyewash stations for flushing out eyes generally for a minimum of 15 minutes.
- **Read the MSDS** for identification of the appropriate emergency equipment.

Bomb Threats

- If you receive a bomb threat by telephone, use the form located on the last page of the KSC telephone book and record as much information as possible. Listen for clues in background noises that may ascertain their location.

- Immediately report any bomb threats or suspicious, unidentified packages by calling 911 (867-7911 on a cell phone). Do not operate cell phones within 25 feet of any suspicious package or suspected threat.

- If instructed by emergency dispatcher to evacuate the facility to the established marshalling area, proceed in an orderly manner avoiding proximity to the threat, and pull the fire alarm to evacuate others.

Workplace Violence

- At KSC, acts of violence, threats, harassment, intimidation or other disruptive behavior is prohibited.
- Persons engaging in such activity may be removed from the premises and may be subject to disciplinary action and criminal penalties.
- Report all incidences of this type of behavior by calling 911 (867-7911 on a cell phone) for emergency scenarios or 867-2121 for non-emergency scenarios.
- If you witness this type of behavior, do not attempt to handle it yourself. Avoid confrontation and call for help.

Section 6 – Safety & Health Awareness

Safety & Health Information

- Safety & Health information is available by clicking on the KSC Safety & Health Planet at KSC Business World. Go to: http://busiinessworld.ksc.nasa.gov/. Features include:
  - "Safety-on-the-line", a monthly publication to disseminate safety & health information. It is also posted by volunteers in KSC restrooms.
  - "Safety Talks", an on-line resource for safety & health information and training topics.
  - Safety and Health Metrics on mishaps, close calls and injury/illness at KSC.
  - "KSC Material Safety Data Sheets", search for MSDSs on hazardous materials used at KSC/CCAFS.
  - "KSC's Occupational Health Program", medical, industrial hygiene, radiation protection, fitness center, and Rehab Works information and services available to KSC employees.
  - An extensive document library for KSC Policy Directives (KPDs) or Management Instructions (KMIs), Procedures & Guidelines (KPGs) or Handbooks (KHBs), Processes (KDPs) and Technical Documents.
- The KSC Daily News is emailed to all employees on a daily basis. In addition, special emails are issued to alert personnel of important and timely safety and health issues.

- The Occupational Safety & Health Administration website provides up-to-date safety and health news, regulations, interpretations, and compliance directives. Go to http://www.osha.gov/.

- KSC's annual OSHA 300 log is posted on all official KSC bulletin boards. This log is required by Federal Law and contains information regarding injuries and illness that occurred on Center over the previous fiscal year.

- KSC TV channel 60 is used for showing safety information videos and may be viewed throughout the Center. Offices may also arrange their safety meetings around the Channel 60 viewing schedule to conduct monthly safety meetings. The KSC Channel 60 schedule is available on the SGS website.

- KSC civil service and contractor organizations participate in the Government-Industry Data Exchange Program (GIDEP) which collects and distributes important safety information through its GIDEP Safety ALERT System. For additional information, go to: http://kscsafety/isqpage.htm.

Space Flight Awareness (SFA) Program

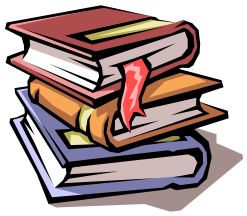
- The Space Flight Awareness (SFA) Program was designed by NASA and the astronauts in the early 1960s as a NASA and industry employee recognition/motivation program. This program focuses on:
  - Employee awareness – the importance of every person's role in promoting mission success and safety
  - Team efforts – collectively meeting the challenges of the future
  - Quality work – do it right the first time
  - Safety of the crew, the vehicle and all participants
  - Pride in being involved in the space program

- Program Activities include:

  - Human space flight awareness events and programs for employees
  - Recognition
    1. Honoree Award
    2. Silver Snoopy Award
    3. SFA Team Award
    4. Leadership Award
    5. Flight Safety Award
    6. Supplier Award

  - Motivation Events & Products
  - Public & Education Outreach -- Attendance at conferences and providing information to schools

- The focal point for the SFA Program at KSC is Lisa Fowler, 867-1883.



Safety & Health Training

- All NASA employees are required to take the following Safety & Health Core Courses:
  - XG160KSC – Chemical Hazard Communication
  - QG109KSC – General Processing Safety
  - QG181KSC – KSC Employee Safety and Health Training
  - QG182KSC – Ergonomics
  - QG184KSC – Office Safety
- In addition, other training such as area access training, specialized classes on physical and chemical hazards or specialized equipment may be required to perform a specific job. All NASA employees are required to fill out a Training Needs Assessment to determine if they have any gaps in their required training.
- Supervisors and managers are required to complete the employee Safety & Health Core Courses listed above, plus:
  - QG180KSC – KSC Supervisor Safety and Health Training
  - DuPont Safety Training (QG183KSC for supervisors or QG185KSC for executives).
  - QG1866KSC – Supervisor GPES and Safety & Health Training
- All employees shall seek and complete training for any job that they feel they need to perform the job safely.
- Safety & health training is available from a number of sources including:
  - Spaceport Services Institutional Safety & Quality Branch (TA-C1). They can provide videos and safety training materials. See http://kscsafety/, call 867-SAFE or contact Steve Brisbin, 867-6133
  - SGS provides & tracks technical training (instructor-based classes and video tapes). For course schedules, go to: http://sgs.ksc.nasa.gov/safety/training or Contact Tim Pirlo, 867-2300.

- For unescorted access to hazardous areas, area access is required. Contact Spaceport Services Institutional Safety and Quality Branch (TA-C1).

- KSC TV channel 60. See http://sgs.ksc.nasa.gov/safety/training or Call Tom Buchman, 867-4320.

- The SH&IA Directorate schedules NASA Safety Training Center (NSTC) Classes. Contact Linda Adams at 867-1972.

- Dupont Safety Training is periodically available through the Workforce & Diversity Management Office (BA) Directorate. Contact Loretta Dreier at 867-3013.

- NASA Headquarters Code Q offers web-based safety and health training. Go to: http://solar.msfc.nasa.gov.

- OSHA and other Federal Agencies. http://www.osha.gov/

- Specialized training is required for all employees with the following certifications. For course schedules, go to: http://sgs.ksc.nasa.gov/safety/training or Contact Tim Pirlo, 867-2300.

  - Forklift operators
  - Crane operators

- All employees who perform work with the following potential exposures require documented, specialized training. For course schedules, go to: http://sgs.ksc.nasa.gov/safety/training or Contact Tim Pirlo, 867-2300.

  - Ionizing or non-ionizing radiation
  - Hazardous Materials
  - Pyrotechnic devices
  - Working on elevated structures (>25 ft. & unenclosed)
  - Lockout/tagout of electrical or mechanical energy sources
  - Entry into confined spaces

Safety Meetings

- All supervisors at KSC are required to hold and document their monthly safety meetings. Supervisors are charged with responsibility for conducting safety and health training for their employees at these meetings.
- KSC has an annual safety and health stand-down day called Spaceport Super Safety & Health Day, usually held in October of each year. Speakers and vendors come on Center to discuss and display safety & health related topics and products, and supervisors are given a block of time to conduct safety & health training with their employees.

-

Spaceport Super Safety & Health Day

Go to: http://www-ss.ksc.nasa.gov/supersafety2002

Section 7 – Inclement Weather

Lightning

- Launch/Spacecraft Facilities: Actions to be taken depend on the facility and stage of operation. If you have questions, contact the complex/facility safety supervisor.

- Notices:

  - Phase I Lightning Advisory: Issued when lightning is expected within five (5) nautical miles of the boundary of a specific lightning alert area within thirty (30) minutes. If outside, seek shelter in a protected building or automobile. Avoid open areas where you are the highest object and go to the lowest area. Avoid proximity with tall objects such as trees, power or poles. Leave open areas and get undercover.

  - Phase II Lightning Warning: Issued when lightning is imminent or occurring within the five (5) nautical mile boundary of a specific lightning alert area. If lightning is imminent or occurring, stay indoors, away from windows and metal doors, and do not use any equipment that could conduct sympathetic voltages into the work area (computers, telephones, water fountains, copiers, etc.)

- The point of contact for lightning and lightning assessments is Terry Willingham, 861-4110

Thunderstorms

- A severe thunderstorm WATCH does not require immediate action and is issued to heighten public awareness.

- A severe thunderstorm WARNING indicates that imminent danger to life and/or property is possible in the path of the storm. The following actions should be taken at once:

  - Postpone all outdoor activity, if at all possible.
  - Pass information on the severe weather warning to other personnel who may not be in a position to hear the original announcement.
  - Take shelter in a sturdy building or a hardtop automobile. DO NOT take shelter in trailers or modular/temporary facilities.
  - Dock boats and stay away from the water.
  - Avoid using hard-lined phones and other electrical appliances (use phone only in an emergency).
  - Get to higher ground if flooding is imminent.
  - Wait for the “all clear” announcement by the Public Address (PA) System.

Tornado

- If you spot a funnel cloud and time permits call 911 (867-7911 on cellular phones) to report it.

- A tornado WATCH means conditions are favorable for tornado development. Listen for updates or possible warnings.

- A tornado WARNING means a tornado has been sighted or is imminent. When a tornado warning (3-5 minute steady siren) is sounded:

  - Seek shelter in a substantial steel-framed or reinforced concrete building.
  - Evacuate structures with wide, free span roofs, such as high bays, aircraft hangars and atriums.
  - If you are unable to reach a steel-frame or reinforced concrete building, lie flat in a ditch or ravine.
  - If outdoors, or inside a minimum shelter, such as a shed, be alert to the possibility of flying debris.
  - If you are in a trailer, evacuate to a suitable building.
  - If you are in a boxcar or modular building, move away from doors and take cover under a desk.
  - Move away from windows and doors (move to interior of the building) and take cover under a desk.
  - If inside a building, stay away from doors and windows (move to the interior of the building) and close hallway doors.
  - If you are on upper floors of a multi-story building, go to the lower floors to prevent injury if the roof comes off.
  - Occupants of vehicles should seek shelter inside a building.
  - Employ the buddy system and assist those in need.

- Report any injuries, downed power lines or gas leaks to 911 (867-7911 for Cell Phones).

- Return to work when “All Clear” is announced.

Hurricane/Tropical Storm

- **HURCON IV:** Issued 72 hrs. in advance of the earliest possible arrival of 50-knot (58 mph) winds.
  - Check hurricane kits and emergency supplies and issue as required.
    - Secure loose objects outside.
    - Fill gas tanks of government vehicles. (Parking may be directed at HURCON III).
    - Secure small buildings and trailers.
    - Move portable equipment inside.
    - Identify essential personnel and recall or place on standby as necessary.
    - Secure hazardous and non-hazardous waste sites at your facilities.
    - Designate essential personnel to be recalled for the recovery of your facilities Damage Assessment Recovery Team (DART).
    - Report major problems to your building custodian or hurricane coordinator.
    - Review HURCON III actions.

- **HURCON III:** Issued 48 hrs. before the earliest possible arrival of 50-knot (58 mph) winds.
  - Ensure that HURCON IV actions are complete.
  - Notify building custodians to begin hurricane preparations, i.e., secure windows, doors, etc.
  - Download computer hard drives to disks and take the disks with you upon evacuation.
  - Cover electrical equipment with plastic and elevate when possible.
  - Secure loose articles from desks and work areas as practical.
  - Park government vehicles where and when directed.
  - Release non-essential personnel when directed.
  - Review HURCON II actions.

- **HURCON II:** Issued 24 hrs. in advance of the earliest predicted arrival of 50-knot (58 mph) winds.
  - Ensure that all HURCON III and HURCON IV actions are complete.
  - Maintain accountability of personnel.
  - Complete hurricane preparations until directed otherwise.
  - EVACUATE when directed (except Hurricane Ride out Teams).

- Monitor local radio and TV for “return to work” calls. This could take several days to weeks.

- **HURCON I:** Hurricane Ride-out Teams’ activities.

- **Hurricane Categories:**

  - Category 1– 74 to 95 mph expected winds, 4 to 5 ft. expected tidal surge
  - Category 2– 96 to 110 mph expected winds, 6 to 8 ft. expected tidal surge
  - Category 3 – 131 to 155 mph expected winds, 13 to 19 ft. expected tidal surge
  - Category 4 **–** greater than 155 expected winds, greater than 19 ft. expected tidal surge

- Call 861-7900 for hurricane status.

Section 8 – Occupational Safety and Health Administration (OSHA) Voluntary Protection Program (VPP)

- The Occupational Safety and Health Administration (OSHA) recognizes outstanding safety and health programs by awarding the Voluntary Protection Program (VPP) Star designation level of achievement.

- Under OSHA's VPP, OSHA partners with management and labor to work for a safer and healthier worksite. Management agrees to operate an effective program that meets an established set of guidelines and employees agree to participate in the program and work with management to continuously improve the safety and health program.

- Sites designated by OSHA at the Star level shall:
  - Comply with and enforce all applicable OSHA regulations.
  - Provide a safe and healthful workplace by implementing exemplary safety and health programs.
  - Perform quarterly self-inspections and identify and correct potential safety and health hazards.
  - Prepare for emergency scenarios and perform accident investigations.
  - Communicate safety and health information to employees to help them work safely and stay healthy, and communicate safety and health information to visitors to protect them.

- While employees are encouraged to be proactive in finding solutions to safety or health issues or concerns at the Center, all employees have the right to file a complaint with OSHA if they feel that an unsafe or unhealthful condition exists and no proactive solution is undertaken.

- KSC is pursuing OSHA VPP qualification as a means of improving its safety and health program.

References

NSS 1740.12, NASA SAFETY STANDARD FOR EXPLOSIVES, PROPELLANTS AND PYROTECHNICS
NPG 8621.1, NASA PROCEDURES AND GUIDELINES FOR MISHAP REPORTING, INVESTIGATING AND RECORDKEEPING
KBM-PL-1.4, NASA EMPLOYEE EXPOSURE CONTROL PLAN FOR BLOODBORNE PATHOGENS
KMI 1150.24, KSC COUNCILS, BOARDS & WORKING GROUPS
KMI 1216.1, SMOKE-FREE WORKPLACE
KM 1710.18, KSC SAFETY ASSURANCE
KMI 1800.2, KSC HAZARD COMMUNICATION PROGRAM
KMI 1810.1, KSC OCCUPATIONAL MEDICINE PROGRAM
KMI 1860.1, KSC RADIATION PROTECTION PROGRAM
KMI 3792.1, KSC EMPLOYEE ASSISTANCE PROGRAM
KMI 6730.3, EXAMINATION AND LICENSING OF KSC SPECIAL OR HEAVY EQUIPMENT OPERATORS
KNPG 3752.2, GUIDELINES FOR DISCIPLINARY ACTIONS
KHB 1610.1, KSC SECURITY HANDBOOK
KHB 1700.7, SPACE SHUTTLE PAYLOAD GROUND SAFETY HANDBOOK
KHB 1710.2, KENNEDY SPACE CENTER SAFETY PRACTICES HANDBOOK
KHB 1820.3, KSC HEARING LOSS PREVENTION PROGRAM
KHB 1820.4, KSC RESPIRATORY PROTECTION PROGRAM
KHB 1840.1, IDUSTRIAL HYGIENE HANDBOOK
KHB 1860.1, KSC IONIZING RADIATION PROTECTION PROGRAM
KHB 1860.2, KSC NONIONIZING RADIATION PROTECTION PROGRAM
KHB 1870.1, KSC SANITATION HANDBOOK
KHB 3410.1, IMPLEMENTING INSTRUCTIONS FOR KSC SYSTEMS, SAFETY AND SKILLS TRAINING, AND FOR CERTIFICATION OF PERSONNEL
KPD 8710.1, KSC/SAFETY, RELIABILITY, MAINTAINABILITY AND QUALITY ASSURANCE PROGRAMS
JHB 2000, CAPE CANAVERAL SPACEPORT CONSOLIDATED COMPREHENSIVE EMERGENCY MANAGEMENT
JDP-KSC-P-3001, WARNING, ALERTING, EVACUATION
JDP-KSC-P-3002, DIRECTION, CONTROL & COMMUNICATION
JDP-KSC-P-3003, FIRE RESPONSE
JDP-KSC-P-3004, LAUNCH ACCIDENTS
JDP-KSC-P-3005, ADVERSE WEATHER
JDP-KSC-P-3006, HURRICANE PREPARATION AND RECOVERY
JDP-KSC-P-3007, DAMAGE ASSESSMENT
JDP-KSC-P-3008, HAZARDOUS MATERIALS RESPONSE
JDP-KSC-P-3009, AIRCRAFT EMERGENCIES
JDP-KSC-P-3010, RECOVERY
JDP-KSC-P-3011, RADIOLOGICAL EMERGENCY
JDP-KSC-P-3012, LOSS OF UTILITIES
JDP-KSC-P-3013, WEAPONS OF MASS DESTRUCTION
JDP-KSC-P-3014, GENERIC EMERGENCY PROCEDURES DOCUMENT (EPD)
JDP-KSC-P-3015, EMERGENCY SUPPORT TO LOCAL GOVERNMENT
KDP-KSC-F-1474, MISHAP INVESTIGATION REPORT

References

KDP-KSC-P-1448, WORKER'S COMPENSATION CLAIMS
KDP-KSC-P-1450, KENNEDY SPACE CENTER CONTINGENCY ACTION PROCEDURE
KDP-KSC-P-1473, NASA MISHAP REPORTING AND INVESTIGATING
KDP-KSC-P-1474, MISHAP INVESTIGATION BOARD
KDP-KSC-P-1728, KSC POLLUTION INCIDENT REPORTING (PIR) SYSTEM
KDP-KSC-P-1749, QUARTERLY SAFETY AND HEALTH COUNCIL
KDP-KSC-F-2111, CLOSE CALLS AND UNSAFE AND/OR UNHEALTHFUL CONDITIONS FORM
KDP-KSC-P-2111, REPORTING CLOSE CALLS
KDP-KSC-P-2321, UNSAFE AND/OR UNHEALTHFUL CONDITIONS OR ACTS
KDP-KSC-P-2393, KSC LESSONS LEARNED INFORMATION SYSTEM (LLIS)

Important Telephone Numbers

Emergency Response – 911
(867-7911 from a cell phone)
NASA Safety Hotline 867-SAFE
Safety Ombuds 867-1982
Shuttle Safety (PH) 861-7901
ELV Safety (VA) 476-3699
ISS/Payload Safety (UB) 867-5868
Spaceport Engineering &Technology Safety
(YA) 867-9135
Safety, Health & Independent Assessment 867-2118
NASA Institutional Safety (TA) 867-6133
NASA Industrial Hygiene Officer 867-6342
NASA Radiation Safety Officer 867-6958
Hazardous Waste/Pollution Prevention 867-1599
NASA Fire Authority Having Jurisdiction 867-3795
NASA Emergency Preparedness Officer 867-8723
Security Desk 867-2121
CCAFS Emergency Operations Center 853-9155/6
KSC Emergency Operations Center 861-9200
Storm Info/Update Hotline 861-7900
Occupational Health Clinic 867-3346
Employee Assistance Program 867-7398
Joint Base Operations Support Contractor
(J-BOSC) Environmental Health 867-2400
J-BOSC Duty Officer 853-5211
KSC Locator 867-4369
J-BOSC Trouble Call 853-3231
KSC Chief Safety Officer 867-1982
KSC Chief Medical Officer 867-6658